CARLETON UNIVERSITY

1962-1963
CALENDAR

FACULTY OF ARTS AND SCIENCE

SCHOOL OF PUBLIC ADMINISTRATION

SCHOOL OF ENGINEERING

DAY AND EVENING DIVISIONS

Ours The Task Eternal

HOW TO REGISTER

- New full-time students enrolling for a degree, diploma, or certificate will take all of these steps.
- New part-time students enrolling for a degree, diploma, or certificate will take steps 1, 2 and 5.
- Returning full-time students will take steps 4 and 5.
- All other students, including returning part-time undergraduates and graduate students, and part-time students not enrolling for a degree, diploma, or certificate, take step 5 only.

1. Complete application for admission on form available from the Registrar's Office. Applications should be submitted to the Registrar well in advance of term opening.

2. Attach certificates of former schooling (Matriculation and any studies pursued subsequently) to application for admission, or arrange for them to be sent to the Registrar.

3. When application has been approved, (a) arrange for physical examination by own physician and (b) have him report results to the University on the Personal Health Record form available from the Registrar's Office. This report must be completed and submitted to the University before final registration.

4. Prior to fall registration *each year*, submit evidence of having had a chest X-ray within six months prior to the opening of classes. This may be arranged, free of charge, at the May Court Clinic, 374 Besserer Street, Ottawa, any time after May 1. (Carleton students may be examined, except in July, on Tuesday, Wednesday, or Thursday, 2 to 4 p.m.) If examined elsewhere, furnish evidence of a negative report: (See also p. 29.)

5. During the appropriate registration period specified under The Academic Year (p. 5), come to the University to (a) arrange final selection of subjects, (b) complete registration forms, (c) pay fees, (d) receive class and library admission cards, and (e) complete required aptitude tests (if new full-time students.)

6. Full-time students enrolling for the first time are to report **to the University, Tuesday morning, September 11, at 9 o'clock.**

- **The attention of all students is drawn to the additional fees required of late registrants, where late registration is permitted. (See p. 33.)**
- University office and library hours are listed inside the back cover.

As this Calendar is published several weeks before the opening of the session, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular courses.

CARLETON UNIVERSITY

Twenty-first Annual Calendar
Day and Evening Divisions
for the academic year 1962 - 1963

Rideau River Campus
Colonel By Drive
Ottawa 1

Telephone: CEntral 5-5161

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THE ACADEMIC YEAR

Summary Session   1962

May 23, 24	Registration for summer session (7 to 9 p.m.).
May 28	Summer session evening classes begin. Day classes begin July 4.
July 15	Last day for applications for supplemental examinations.
Aug. 6	Civic Holiday. University closed.*
Aug. 16	Last day of summer session classes.
Aug. 17, 20, 21	Summer session examinations.

*Evening classes will meet instead on the following Friday.

Winter Session

Aug. 27-29	Supplemental examinations.
Sept. 3	Labour Day. University closed.
Sept. 12-18	**Registration for classes in day and evening divisions:**

Wednesday, Sept. 12
Thursday, Sept. 13
Friday, Sept. 14

1.30-4.30 p.m.
7.30-10 p.m.

Registration of new students into Qualifying and 1st year

Registration of evening students

Monday, Sept. 17
Tuesday, Sept. 18

1.30-4.30 p.m.
7.30-10 p.m.

Registration of returning students in all years. Registration of new students into 2nd, 3rd, and 4th years.

Monday, Sept. 17
Tuesday, Sept. 18

7.30-10 p.m.

Registration of graduate students

Sept. 19	Classes begin in all courses, day and evening.
Oct. 1	{ Last day for late registration. Last day for change from one course to another.
Oct. 8	Thanksgiving Day. University closed.
Oct. 13	Last day for applications for summer session supplemental examinations.
Nov. 17	Summer Session supplemental examinations.
Dec. 15	Last day of classes in the first term, day and evening divisions.
Dec. 17-22	Mid-year examinations. (See also Jan. 2-5).

1963

Jan. 2-5	Final examinations in first term half courses, and remaining mid-year examinations.
Jan. 7	Second term begins in day and evening divisions.
Feb. 15	Last day for formal withdrawal from courses.
Feb. 23-26	Mid-term break. (No classes).
April 11	Last day of classes in the second term, day and evening divisions.
April 12-15	Easter week-end. University closed.
April 22-May 4	Final examinations in day and evening divisions.
May 4	Last day for handing in of term assignments.
May 24	Convocation for the conferring of degrees.

HISTORICAL STATEMENT

The Ottawa Association for the Advancement of Learning, later to become Carleton College and finally Carleton University, was established in the summer of 1942, and opened its first classes on September 21 in that year. In the first three years teaching was done in evening classes only, in rented premises, and by part-time instructors. Instruction was given in the subjects of Grade XIII (Ontario) and first year university, with a few courses in the elements of public administration.

On March 19, 1945, day classes in matriculation courses were opened for the benefit of war veterans. In the following years, as the number of veterans diminished, civilian students were admitted to day classes.

In September, 1945, courses in Journalism and in the first year of Engineering were added to those already provided in Arts, Science, and Commerce, and all these programs were consolidated in a Faculty of Arts and Science.

The first degrees of the University, three Bachelor of Journalism and three Bachelor of Public Administration, were conferred on October 23, 1946.

On February 6, 1947, the University sustained a severe blow in the loss by death of Henry Marshall Tory, D.Sc., LL.D., D.C.L., F.R.S.C., first President of Carleton University and the leader more responsible than any other for the success attained by the University in the first five years of its existence. On February 18, 1947, Murdoch Maxwell MacOdrum, M.A., Ph.D., Vice-President of the University, was appointed by the Board of Governors to succeed Dr. Tory as President.

Upon Dr. MacOdrum's death on August 1, 1955, following eight years of outstanding leadership, the Board of Governors appointed James Alexander Gibson, M.A., D.Phil., Dean of the Faculty of Arts and Sciences, as Acting President of the College.

On January 31, 1956, Claude Thomas Bissell, M.A., Ph.D., F.R.S.C., Vice-President of the University of Toronto, was appointed President, taking office on July 1, 1956, and serving until June 30, 1958.

On July 4, 1958 Arnold Davidson Dunton, LL.D., D.Sc., was appointed by the Board of Governors to succeed Dr. Bissell as President (Dr. Bissell having accepted appointment as President of the University of Toronto.)

In the summer of 1947 the University announced its plans for the organization of complete four-year Courses and five-year Honours Courses leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Commerce. The third year in all these courses was made available to students of the University in September, 1947, the fourth year in September, 1948, and the fifth year of certain Honours Courses in September, 1949. The first degrees in Arts, Science and Commerce were conferred in May, 1949, and the first Honours degrees in May 1950. A program of studies leading to a Graduate Diploma in Public Administration was introduced in 1952. A School of Public Administration was established in 1953 and in the following year candidates were accepted for the M.A. degree in that field. The first M.A. degree was conferred in May, 1955.

By May 1961 the University had conferred 1,493 Bachelor's degrees. The School of Engineering was established in 1957, and the first Bachelor of Engineering degrees were conferred in May, 1961. Graduate studies in Engineering leading to the Master of Engineering degree were introduced in 1960.

On February 26, 1954, the University conferred its first honorary degree of LL.D. on Dag Hammerskjold, Secretary-General of the United Nations.

On November 23, 1954, Dr. C. J. Mackenzie was installed as second Chancellor of the University, succeeding Dr. H. S. Southam, who had served as first Chancellor from June 19, 1952 until his death on March 27, 1954.

The first full-time teaching appointments in the ranks of lecturer, assistant professor, associate professor, and professor became effective on September 1, 1947. These appointments, and all subsequent appointments to the teaching staff, have carried from the beginning the appropriate privileges of professional tenure.

As of June 19, 1943, The Ottawa Association for the Advancement of Learning became an incorporated body by Letters Patent. In order that the power to grant degrees should be specifically recited, application to the Legislature of the Province of Ontario for this and other academic powers and to change the name, resulted in the Carleton College Act, 1952, whereby the institution became Carleton College, endowed with university powers, and with "authority to grant in all branches of learning any and all university degrees and honorary degrees, and diplomas", and "power to establish and maintain such faculties, schools, institutes, departments, chairs and courses of instruction as shall be deemed meet by the Board". A further application to the Legislature of the Province of Ontario, resulted in the Carleton University Act, 1957, changing the name to Carleton University.

On June 11, 1952, the University was made a member of the National Conference of Canadian Universities, and on February 26, 1953, a member of the Association of Universities of the British Commonwealth.

The University is non-sectarian and co-educational. Its conduct and management is vested in a Board of Governors.

Enrolment in the winter session 1961-62 in day and evening divisions, included 1553 full-time students and 1290 part-time students in courses offered for academic credit, and 700 registered in non-credit extension courses; a total of 3543.

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SENATE OF THE UNIVERSITY

OFFICERS OF ADMINISTRATION

PRESIDENT AND VICE-CHANCELLOR

A. DAVIDSON DUNTON,

LL.D. (Saskatchewan, Queen's, British Columbia), D.SC. (Laval)

DEAN OF THE FACULTY OF ARTS AND SCIENCE
AND CHAIRMAN, DIVISION OF HUMANITIES AND SOCIAL SCIENCES

JAMES ALEXANDER GIBSON,

B.A. (British Columbia), M.A., B.LITT., D.PHIL. (Oxford)

DIRECTOR OF THE SCHOOL OF PUBLIC ADMINISTRATION

RONALD OLIVER MACFARLANE, M.A. (Queen's), PH.D. (Harvard)

ASSOCIATE DEAN OF THE FACULTY OF ARTS AND SCIENCE,
AND DIRECTOR, SCHOOL OF GRADUATE STUDIES

MORAY ST. JOHN MACPHAIL,

B.A. (Queen's) M.A. (McGill), D.PHIL. (Oxford), F.R.S.C.

DIRECTOR OF THE DIVISION OF SCIENCE

H. H. J. NESBITT, B.A. (Queen's), M.A., PH.D. (Toronto),
D.SC. (Leiden), F.L.S., F.Z.S.

DIRECTOR OF THE SCHOOL OF ENGINEERING

JOHN RUPTASH,

B.SC. (Alberta), M.A.SC., PH.D. (Toronto)

REGISTRAR

JOHN ALEXANDER BUCHANAN MCLEISH,
M.A. (McGill), PH.D. (Cornell)

ASSISTANT REGISTRAR

ELIZABETH M. BUCKLEY, B.A. (Queen's)

ASSISTANTS TO THE REGISTRAR

DORIS M. TYNER,
B.A. (Carleton)

C. IAN LUMSDEN,
B.A. (Manchester)
M.A. (Stanford)

BURSAR
Frederick James Turner, b.com., m.a. (Toronto), f.c.i.s.

ACCOUNTANT
Albert B. Larose, b.com. (Carleton), c.a.

PLANT SUPERVISOR
Lionel H. Phipps

CONSTRUCTION CO-ORDINATOR
G. Ross Love, m.a. (Western Ontario), ph.d. (Toronto)

LIBRARIAN
Hilda G. Gifford, b.a., b.l.s. (McGill)

CHIEF OF PROCESSING
Jean M. Blue, m.a. (St. Andrews) a.l.a.

CHIEF OF PUBLIC SERVICES
Anna L. Holman, b.a. (Carleton), b.l.s. (McGill)

ALUMNI SECRETARY
Shirley Gillespie, b.j. (Carleton)

DIRECTOR OF STUDENT AFFAIRS
Norman D. Fenn, b.s., m.ed. (Springfield)

STUDENT PERSONNEL OFFICER
Jean Alexandra Loates,
b.a. (Carleton)

MEDICAL ADVISER
Eric L. Davey,
m.d., d.p.h. (Toronto)

HEAD OF RESIDENCE
Eileen Cox,
b.a. (Toronto)

SENIOR RESIDENT
Duncan Edmonds
b.a. (Toronto)

DIRECTOR OF ATHLETICS
Keith N. Harris, b.a., b.ph.e. (Queen's)

Professors, Associate Professors, Assistant Professors, Lecturers

Douglas G. Anglin, B.A. (Toronto), M.A., D.PHIL. (Oxford),
Associate Professor of Political Science (on leave of absence, 1962-63)

J. W. ApSimon, B.SC., PH.D. (Liverpool),
Assistant Professor of Chemistry

Francisco Atienza, B.T. (Salamanca), LIC.T. (Innsbruck), LIC.J.C. (Rome), D.J.C. (Ottawa),
Special Lecturer in Spanish

Manfred Bambeck, DR.PHIL. (Frankfurt), CERT.PED. (Marburg),
Assistant Professor of French

Isabel Law Bayly, B.SC. (Carleton), M.A. (Toronto),
Assistant Professor of Biology

Alexander Munro Beattie, B.A. (Toronto), A.M., PH.D. (Columbia),
Professor of English

Dolores Bedingfield, M.A. (Memorial),
Lecturer in English

Paul R. Beesack, B.A. (McMaster), A.M., PH.D. (Washington),
Associate Professor of Mathematics

Desmond G. Bowen, B.A. (Carleton), M.A. (Queen's),
Assistant Professor of History

William H. Bowes, DIP.ENG. (Dalhousie), B.ENG., M.ENG. (Nova Scotia Tech.), M.SC. (Michigan),
Associate Professor of Engineering

Thomas Newton Brewis, M.COM., PH.D (Durham),
Associate Professor of Economics

Adam Bromke, M.A. (St. Andrews), PH.D. (Montreal),
Assistant Professor of Political Science

Hyman Burshtyn, M.A. (McGill),
Assistant Professor of Sociology

E. A. Cherniak, M.A. (Queen's), PH.D. (Leeds),
Assistant Professor of Chemistry

T. James S. Cole, B.SC. (Eng.) (London), B.SC. (Carleton), PH.D. (Cambridge), A.C.G.I.,
Associate Professor of Physics

Paulette F. J. Collet, B.A., DIP.ED. (London), M.A. (Laval),
Lecturer in French

Gordon S. Couse, B.A. (McMaster),
Associate Professor of History

Douglas Keith Dale, B.A. (Queen's), M.SC. (North Carolina),
Associate Professor of Mathematics

M. Nancy Donald, M.A., DIP.EDUC. (New Zealand), PH.D. (Michigan),
Associate Professor of Psychology

Duncan Edmonds, B.A. (Toronto),
  Lecturer in Political Science
Wilfrid Eggleston, M.B.E., B.A. (Queen's), F.A.G.S.,
  Professor of Journalism
H. Edward English, B.A. (British Columbia), PH.D. (California),
  Associate Professor of Economics (on leave of absence, 1962-63)
David M. L. Farr, B.A. (British Columbia), M.A. (Toronto),
  D.PHIL. (Oxford),
  Professor of History
Charles Paul Fleischauer, A.M., PH.D. (Harvard),
  Associate Professor of French
Allan Guy Forman, B.A., M.SC. (British Columbia),
  Assistant Professor of Chemistry
Jeremy C. Forster, M.A. (Cambridge),
  Assistant Professor of Spanish
Muni C. Frumhartz, B.A. (Toronto), A.M. (Columbia),
  Associate Professor of Sociology
R. Bruce Gamble, B.SC. (McGill),
  Lecturer in Mathematics
J. G. Garrard, B.A. (Oxford),
  Lecturer in Russian (on leave of absence, 1962-63)
D. A. George, B.ENG. (McGill), M.S. (Stanford), SC.D. (M.I.T.),
  Assistant Professor of Engineering
Amal Chandra Ghosh, M.SC. (Calcutta), PH.D. (McGill),
  Associate Professor of Physics
James Alexander Gibson, B.A. (British Columbia),
  M.A., B.LITT., D.PHIL. (Oxford),
  Professor of History
E. E. Goldsmith, DIPL. ING. (Berlin), D.I.C. (London), M.E.I.C., A.M.I.E.E.,
  Associate Professor of Engineering
H. Scott Gordon, B.A. (Dalhousie), A.M. (Columbia),
  Professor of Economics
Naomi E. S. Griffiths, B.A. (London), M.A. (New Brunswick),
  Lecturer in History
Malcolm A. Gullen, B.SC. (Edinburgh), M.S. (Purdue),
  Associate Professor of Engineering
Maureen M. Hanna, B.A., B.LITT. (Oxford),
  Lecturer in English
John Hart, B.SC., PH.D. (London), F. INST.P.,
  Professor of Physics
Patrick Arthur Hill, B.SC. (London), PH.D. (Columbia), F.G.S., F.P.S.,
  F.R.G.S.,
  Associate Professor of Geology

A. Trevor Hodge, M.A., PH.D., (Cambridge),
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Natasha C. Hollbach, B.SC. (Dalhousie), PH.D. (McGill),
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James M. Holmes, B.SC. (New Brunswick), M.A. (Western Ontario),
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Kenneth Hooper, M.SC. (London), F.G.S.,
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William Irwin Illman, B.A., M.SC., PH.D. (Western Ontario),
    Associate Professor of Biology (Botany)
Andrew Jeffrey, M.A. (St. Andrews),
    Lecturer in Philosophy
Thomas J. Jemielity, M.A. (John Carroll),
    Lecturer in English
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    Associate Professor of Political Science
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    Lecturer in Political Science
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    Lecturer in Russian

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Donald C. Rowat, B.A. (Toronto), A.M., PH.D. (Columbia),
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Associate Professor of Biology

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Associate Professor of Mathematics

Donald Alan Smith, M.A., PH.D. (Toronto),
Assistant Professor of Biology (Zoology)

Brian J. Spenceley, M.A. (Virginia),
Lecturer in Physics

John W. Strong, B.A. (Colby), M.A. (Boston),
Lecturer in History

M. K. Sundaresan, M.SC. (Delhi), PH.D. (Cornell),
Associate Professor of Physics

F. Ellenor M. Swallow, M.A. (Alberta), PH.D. (Cornell),
Associate Professor of Classics

S. G. Tackaberry, c.b.e., b.a.sc. (Toronto), m.e.i.c.,
  Assistant Professor of Engineering
R. Stephen Talmage, m.a. (Oxford),
  Assistant Professor of Philosophy
James S. Tassie, b.a. (McMaster), m.a., ph.d. (Toronto),
  Associate Professor of French
James M. Thompson, m.a. (Toronto),
  Assistant Professor of Philosophy
W. Tupper, m.sc. (New Brunswick), ph.d. (M.I.T.),
  Assistant Professor of Geology
Karl Van Dalen, b.sc. (Queen's), d.i.c., m.sc. (London),
  Assistant Professor of Engineering
Frank Robert Wake, b.a., ph.d. (McGill),
  Associate Professor of Psychology
W. E. Walther, b.a. (Chico State), m.sc. (San Diego State),
  Lecturer in Psychology
Bernard Wand, b.a. (Queen's), m.a., ph.d. (Cornell),
  Associate Professor of Philosophy
Russell Allen Wendt, m.a. (Alberta),
  Associate Professor of Psychology
James C. S. Wernham, m.a. (Aberdeen and Cambridge), s.t.m. (Union),
  Professor of Philosophy
Frank Wightman, b.sc., ph.d. (Leeds),
  Associate Professor of Biology (Botany)
D. R. Wiles, b.sc. (Mount Allison), m.sc. (McMaster), ph.d. (M.I.T.),
  Assistant Professor of Chemistry
Gordon James Wood, m.a. (Toronto),
  Associate Professor of English
Whitman Wright, b.a.sc. (Toronto),
  Assistant Professor of Engineering
Lorna D. Young, b.a. (Carleton), m.a. (Rochester), ph.d. (Dublin),
  Assistant Professor of English
William L. Young, m.sc., ph.d. (McGill),
  Associate Professor of Geology (on leave of absence, 1962-63)
Renate Astrid Zwingenberger, m.a. (Toronto),
  Lecturer in German
Sessional Lecturers, Instructors, Demonstrators, and others
R. M. Adams, b.a. (Western), m.a. (Queen's), ph.d. (London),
  Sessional Lecturer in Economics*

---

*Part time

F. J. Alcock, B.A. (Toronto), PH.D. (Yale), F.R.S.C., F.G.S.A.,
   Special Lecturer in Geology*
Marjorie Allen, B.SC. (Columbia), M.SC. (Northwestern),
   Chief Demonstrator in Geology*
Elizabeth M. Arnason, M.S. (Purdue), PH.D. (Illinois),
   Demonstrator in Biology
Frances Oakes Baldwin, B.A. (Saskatchewan), B.J. (Carleton),
   Sessional Lecturer in Journalism*
Lloyd Bannerman, M.A. (British Columbia), M.A. (Toronto),
   Sessional Lecturer in Philosophy*
R. L. Beatty, B.A. (Toronto),
   Sessional Lecturer in Mathematics*
G. Belkov, M.A. (British Columbia),
   Special Lecturer in Russian*
W. R. N. Blair, M.A. (Alberta), PH.D. (Ottawa),
   Sessional Lecturer in Psychology*
Robert M. Bone, B.A. (British Columbia), M.A. (Washington),
   Sessional Lecturer in Geography*
R. L. Borden, M.SC. (Alberta), M.B.A. (Western),
   Sessional Lecturer in Geology*
R. W. Boyle, M.A., PH.D. (Toronto), F.R.S.C.,
   Sessional Lecturer in Geology*
C. N. Brennan, B.COM. (British Columbia), M.S. (Columbia), C.A.,
   Sessional Lecturer in Accounting*
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   Sessional Lecturer in Economics*
John Briggs, B.A. (Carleton),
   Sessional Lecturer in Psychology*
Donald W. Brooks, B.SC. (Queen's),
   Sessional Lecturer in Engineering*
Irene Brownstein, B.S. (Queens College, New York), M.S. (Chicago),
   Senior Demonstrator in Chemistry*
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   Sessional Lecturer in German*
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   Departmental Assistant in Psychology*
Elizabeth Butterill, B.A. (Western Ontario),
   Demonstrator in Physics*
L. J. Byrne, M.A. (Toronto),
   Sessional Lecturer in Mathematics*

*Part time

Martha M. Camfield, M.A. (Oxon), B.A. (Carleton),
  Sessional Lecturer in German*
Edwina Carson, B.A. (Western),
  Instructor in English*
A. A. Cattanach, Q.C., B.A. (Manitoba), LL.B. (Saskatchewan),
  Sessional Lecturer in Public Law*
F. J. Chambers, B.A. (Western), M.SC. (ECON.) (London),
  PH.D. (Toronto),
  Sessional Lecturer in Economics*
Marcus S. Chappell, B.A.SC. (British Columbia),
  Sessional Lecturer in Engineering
C. E. Clifford, B.SC. (Carleton), M.SC., PH.D. (McGill),
  Sessional Lecturer in Physics*
E. P. Cockshutt, B.A.SC. (Toronto), S.M., MECH.ENG., SC.D. (M.I.T.),
  Sessional Lecturer in Engineering*
David C. Coll, M.ENG. (McGill),
  Sessional Lecturer in Engineering*
L. S. Collett, B.SC. (McMaster), M.A. (Toronto),
  Sessional Lecturer in Geology
Jean Collins, M.A. (McGill),
  Instructor in English
Murray E. Corlett, Q.C., B.A. (Toronto),
  Sessional Lecturer in Commercial Law*
Carl B. Crawford, B.SC. (Queen's), M.SC. (Northwestern),
  D.I.C. (London),
  Sessional Lecturer in Engineering*
Patricia Cross, B.SC. (Cardiff),
  Demonstrator in Physics*
Norman DePoe,
  Seminar Leader in Journalism*
L. A. Donaldson, B.SC. (Queen's), PH.D. (Johns Hopkins), F.G.A.C.,
  Sessional Lecturer in Geology*
G. S. DuVernet, M.A. (Toronto),
  Sessional Lecturer in French*
W. R. Dymond, M.A. (Toronto), PH.D. (Cornell),
  Sessional Lecturer in Economics*
Simon L. Eckstein, B.A., B.R.E. (Yeshiva), M.A. (New York),
  Sessional Lecturer in Religion*
R. T. Elworthy, M.B.E., B.SC., PH.D. (London),
  Senior Demonstrator in Chemistry*

*Part time

Lionel Feldman, B.A. (McMaster), M.A. (Carleton),
      Sessional Lecturer in Political Science*
Ivan Fellegi, M.SC., PH.D. (Carleton),
      Sessional Lecturer in Mathematics*
Gretl Fischer, B.A. (British Columbia), M.A. (Carleton),
      Instructor in English*
Kenneth Flaherty,
      Field Work Supervisor in Journalism*
Jean P. Fletcher, M.A., PH.D. (Toronto),
      Sessional Lecturer in Biology*
J. Keith Fraser, B.A. (Toronto),
      Sessional Lecturer in Geography*
William Fraser, B.A. (Carleton),
      Sessional Lecturer in French*
H. Frisch, PH.D. (Berlin),
      Sessional Lecturer in Russian*
Barbara Gaizanskas, M.A. (Toronto),
      Demonstrator in Physics*
Robert Gardiner,
      Field Work Supervisor in Journalism*
James C. Gardner, B.A., M.ED. (Toronto),
      Sessional Lecturer in Mathematics*
N. M. Goble, M.A. (Edinburgh),
      Sessional Lecturer in Classics*
Barbara Gordon, B.A. (Toronto),
      Demonstrator in Biology
Donald G. Gould, M.A.SC., PH.D. (Toronto),
      Sessional Lecturer in Engineering*
Ronald Grantham, M.A. (British Columbia),
      Sessional Lecturer in History*
A. M. Guénault, B.A., PH.D. (Cambridge),
      Sessional Lecturer in Physics
Kenneth E. Hall, B.SC. (New Brunswick), M.A. (Toronto),
      Demonstrator in Physics*
Gordon F. Henderson, Q.C., B.A. (Toronto),
      Sessional Lecturer in Public Law*
Walter B. Herbert, B.A., LL.B. (Alberta),
      Seminar Leader in Journalism*
J. Marie Hicks, B.A. (Queen,s),
      Instructor in English*
Dorothy Judge, B.A. (McGill),
      Instructor in English*

*Part time

C. S. Juvet, B.COM. (Queen's), M.A. (Carleton),
Sessional Lecturer in Political Science*
George J. Klein, B.A.SC. (Toronto),
Sessional Lecturer in Engineering
D. I. Lalkow, M.D. (Moscow),
Sessional Lecturer in Russian (Honorary)
Albert B. Larose, B.COM. (Carleton), C.A.,
Sessional Lecturer in Accounting*
A. B. Laver, M.A. (Queen's),
Sessional Lecturer in Psychology*
C. W. Leggatt, B.S.A. (Toronto), M.SC. (Alberta), PH.D. (Toronto),
F.A.I.C.,
Demonstrator in Biology
F. R. Lipsett, M.A.SC. (British Columbia), PH.D. (London),
Sessional Lecturer in Physics*
Bruce B. MacNabb, B.SC. (Queen's), D.L.S.,
Sessional Lecturer in Engineering*
P. Mandl, M.A., PH.D. (Toronto),
Sessional Lecturer in Engineering*
William H. McCreary, B.A.SC. M.COM. (Toronto),
Sessional Lecturer in Engineering*
T. F. S. McFeat, B.A. (McGill), PH.D. (Harvard),
Sessional Lecturer in Sociology*
J. M. McQueen, M.A. (Toronto),
Honorary Lecturer in History
Madeleine Mélèse, L. ès Sc., Licencié d'enseignement (Sorbonne),
Sessional Lecturer in French*
Raymond F. Meyer, B.ENG. (New Zealand), PH.D. (Manchester),
Sessional Lecturer in Engineering*
Carman H. Milligan, MUS.BAC. (Toronto), M.MUS. (Rochester),
Sessional Lecturer in Fine Arts*
Frank H. Morgan, B.A. (McGill), B.D. (United Theological College),
Sessional Lecturer in Religion*
C. Moser, M.SC. (Zurich),
Sessional Lecturer in Mathematics*
R. Joy Murray, B.A. (McGill),
Instructor in English*
E. R. Niblett, M.SC. (Toronto), PH.D. (Cambridge),
Sessional Lecturer in Geology*
Eunice Northover, M.A. (Cambridge),
Sessional Lecturer in Mathematics*

*Part time

W. G. Ormsby, B.A. (Toronto), M.A. (Carleton),
   Sessional Lecturer in History*
T. R. Osborne, B.SC. (Calcutta), B.ED. (Nagpore),
   Sessional Lecturer in Physics*
Virginia Prince, B.A. (Toronto),
   Senior Demonstrator in Chemistry
William T. Rainbird, B.ENG. (Canterbury), D.C.A. (Cranfield),
   Sessional Lecturer in Engineering*
L. W. Rentner, B.A. (Toronto),
   Sessional Lecturer in Mathematics*
Marcel Rioux, M.A. (Montreal), DIP.ETH. (Paris),
   Sessional Lecturer in Sociology*
J. K. B. Robertson, B.A. (Queen's), M.A. (Toronto),
   Sessional Lecturer in Fine Arts*
P. Robinson, PH.D. (Cape Town),
   Sessional Lecturer in Mathematics*
John Rolfe, B.SC., PH.D. (London),
   Sessional Lecturer in Engineering*
M. Romanowski, M.A. (Geneva),
   Sessional Lecturer in Physics*
R. Ruedy, PH.D. (Geneva),
   Senior Demonstrator in Physics*
Velma Rust, B.SC., M.ED. (Alberta), PH.D. (Illinois),
   Sessional Lecturer in Mathematics*
Thomas K. Rymes, B.A. (Manitoba), M.A. (McGill),
   Sessional Lecturer in Economics*
Grace Sangster, M.A. (Toronto),
   Demonstrator in Physics*
P. W. Sargeant, B.SC. (Carleton),
   Demonstrator in Physics*
J. H. Scarffe, B.A. (McMaster), M.A. (Toronto),
   Sessional Lecturer in Political Science (Public Administration)
W. H. Showman, M.A. (Queen's),
   Sessional Lecturer in Classics*
John H. Simpson, B.ENG. (McGill), PH.D. (Bristol),
   Sessional Lecturer in Engineering*
Harold W. Smith, B.A.SC. (Toronto), SC.D. (M.I.T.),
   Sessional Lecturer in Engineering*
V. E. F. Solman, M.A., PH.D. (Toronto),
   Sessional Lecturer in Biology*

*Part time

D. G. Stephenson, B.A.SC. (Toronto), PH.D. (London),
Sessional Lecturer in Engineering*

A. A. Sterns, LIC. COM. (St. Gallen), DR.RER.POL. (Berne),
Sessional Lecturer in Accounting*

E. Stichling, DIPL.PHILOL. (Stavzopol),
Special Lecturer in Russian*

Audrey Strutt, B.A. (Toronto),
Instructor in English*

Robert J. Templin, B.A.SC. (Toronto),
Sessional Lecturer in Engineering*

John S. Tener, M.A., PH.D. (British Columbia),
Sessional Lecturer in Biology*

Barbara Turner, B.SC. (London),
Sessional Lecturer in Mathematics*

Ruth M. Underhill, B.A. (Saskatchewan), M.A. (Toronto),
Instructor in English

Audrey Vernon, B.A. (Nottingham),
Instructor in English*

Hans J. von Baeyer, PH.D. (Heidelberg),
Sessional Lecturer in Engineering*

J. Wreford Watson, M.A. (Edinburgh), PH.D. (Toronto), F.R.S.C.,
Visiting Professor of Geography, Summer 1962

Gerald Wheeler, F.R.C.O.,
Sessional Lecturer in Music*

Derek A. White, B.A. (Carleton),
Sessional Lecturer in Economics*

Enid White, B.SC. (ECON.) (London),
Sessional Lecturer in Sociology*

A. J. Wickens, M.SC.,
Sessional Lecturer in Mathematics*

A. M. Willms, M.A. (Toronto and Carleton),
Sessional Lecturer in Political Science*

Alice E. Wilson, M.B.E., B.A. (Toronto), PH.D. (Chicago), F.R.S.C.,
F.G.S.A., LL.D. (Carleton),
Sessional Lecturer in Geology*

T. Y. Wu, B.SC. (Nankai), A.M., PH.D. (Michigan), F.R.S.C.,
Sessional Lecturer in Physics*

Douglas Wurtele, B.A. (London),
Sessional Lecturer in English*

Günter W. Wyszecki, DIPL.ING., DR.ING. (Berlin),
Sessional Lecturer in Physics*

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*Part time

FACULTY OF ARTS AND SCIENCE
DIVISION OF HUMANITIES AND SOCIAL SCIENCES

Bachelor of Arts (B.A.)—
Offered in both day and evening divisions. Details on pp. 42-45.

Bachelor of Arts with Honours—first two years offered in both day and evening divisions; last three years in day division only. **See also pp. 73-75.**

Bachelor of Arts with Honours in Public Administration (B.A.)—Details on pp. 55-56.
First two years offered in both day and evening divisions; last three years in day division only.

Certificate in Public Service Studies (C.P.S.S.)—Details on p. 57.
Offered in day and evening divisions.

Bachelor of Commerce (B.COM.)—Details on pp. 46-48.
Offered in both day and evening divisions.

Bachelor of Journalism (B.J.)—Details on pp. 49-53.
First two years offered in both day and evening divisions; last two years, and postgraduate year, offered in day division only.

DIVISION OF SCIENCE

Bachelor of Science (B.SC.)—Offered in both day and evening divisions. **Evening candidates normally expected to take certain senior courses in day division.** Details on pp. 61-63.

Bachelor of Science with Honours—first two years offered in both day and evening divisions; last three years in day division only. **See also pp. 73-75.**

SCHOOL OF ENGINEERING

Bachelor of Engineering (B.ENG.)—Details on pp. 64-70.
Offered in the day division only.

Master of Engineering (M.ENG.)—see pp. 70-72 and 76-78.

HONOURS COURSES

The program is fully described on pp. 73-75, and the detailed offerings and requirements by subject areas on pp. 81-182.

GRADUATE PROGRAMS IN ARTS, SCIENCE, AND ENGINEERING

Master of Arts (M.A.) and *Master of Science* (M.SC.); *Doctor of Philosophy* (PH.D.).

Graduate Diploma in Public Administration (Dip. Pub. Admin.)—Details on pp. 58-59.
Offered in both day and evening divisions.

Master of Arts in Public Administration (M.A.)—Details on pp. 59-60.
Offered in day division only, except with permission.

Master of Engineering, see p. 70.

For a general description of graduate offerings at Carleton University, please see pp. 76-78.

COURSES FOR THOSE WHO ARE NOT CANDIDATES FOR CERTIFICATE, DIPLOMA, OR DEGREE

Subjects in the curricula of the Faculty of Arts and Science and the School of Public Administration are open to persons who do not wish to study for a certificate, diploma, or degree, providing that they have the required background for those they choose.

As an extension service, non-credit courses in subjects of cultural and vocational value are open to members of the public. The Committee on Adult Education issues a number of bulletins describing this program. Copies can be obtained, on request, from the Registrar's Office.

COURSES IN CENTRES OUTSIDE OTTAWA

By agreement with other universities of Ontario, Carleton University is prepared to offer university courses in centres outside Ottawa in the counties of Carleton, Dundas, Grenville, Lanark and Renfrew, and to consider applications for academic credit for courses taken from other universities in other centres.

PRE-PROFESSIONAL COURSES

Students who plan to undertake further professional training after completion of their studies in Carleton University are invited to consult the Registrar for aid in selection of their courses.

Among the fields for which **preparatory** courses may be planned at Carleton are:

Graduate Studies in	Law	Accounting
Arts and Science	Theology	Architecture
Public Administration	Teaching	Forestry
Medicine	Library Science	Pharmacy
Dentistry	Social Work	Surveying (D.L.S. and O.L.S.)

Special arrangements have been made for studies at Carleton in preparation for the examinations of the Society of Industrial and Cost Accountants of Ontario, and the Chartered Institute of Secretaries of Joint Stock Companies and other Public Bodies, and for entry to the Ontario College of Education.

Admission by Equivalent Examination

Examinations Equivalent to the Ontario Secondary School Graduation Diploma

The following certificates recognized as equivalent to the Ontario Secondary School Graduation Diploma may be accepted in so far as they meet the admission requirements of Carleton University .

Quebec	Quebec High School Leaving, or McGill Junior Matriculation
Alberta	Junior Matriculation (Grade XI)
British Columbia	Junior Matriculation (Grade XII)
Manitoba	Grade XI
New Brunswick	Junior Matriculation (Grade XII)
Newfoundland	Grade XI
Nova Scotia	Junior Matriculation (Grade XI)
Prince Edward Island	First Class License or Second Year Certificate from Prince of Wales College
Saskatchewan	Grade XI

Examinations Equivalent to Grade XIII (Canada and Great Britain)

The following certificates recognized as equivalent to the Ontario Grade XIII certificate may be accepted in so far as they meet the Senior Matriculation requirements of Carleton University.

Quebec	Quebec Senior High School Leaving Certificate, or McGill Senior Matriculation
Alberta	Senior Matriculation (Grade XII)
British Columbia	Senior Matriculation (Grade XIII)
Manitoba	Senior Matriculation (Grade XII)
New Brunswick	Senior Matriculation (Grade XIII)
Nova Scotia	Senior Matriculation (Grade XII)
Prince Edward Island	Honour Diploma of Third Year, Prince of Wales College
Saskatchewan	Senior Matriculation (Grade XII)
England, Northern Ireland, and Wales	The General Certificate of the various English Universities and the Welsh Joint Education Committee with passes in six subjects, of appropriate distribution, of which two must be at the Advanced Level.
Scotland	The Scottish Universities Entrance Board's Certificate of Attestation of Fitness.

Certificates from the United States and other lands are accepted in so far as they are equivalent.

UNIVERSITY SERVICES AND FACILITIES

CLASS HOURS

Most classes (day and evening) meet for three hours a week. Those involving laboratory work usually meet for that purpose for an additional three or four-hour period once a week.

Summer session evening classes usually meet for two and one-half hours on each of two evenings a week with additional laboratory periods weekly in science courses. Summer day classes meet usually for two hours a day for six weeks.

Class timetables are published separately for the day and evening divisions, and may be obtained from the Registrar's Office.

FACILITIES

In 1959 the University moved to its present campus on the Rideau River. Three buildings, Science, Arts, and the Library, are in full operation. Five additional buildings will be ready for use in 1962.

The Henry Marshall Tory Building for Science, a contemporary five-level structure, is equipped for Engineering, Biology, Chemistry, Geology, and Physics studies, and includes a Digital Computing Centre, classrooms, and instrument shops.

The Maxwell MacOdrum Library, large enough to accommodate 480 readers and 108,000 volumes, also houses the administrative offices of the University.

The Arts building, Norman Paterson Hall, provides many additional classrooms and seminar rooms of various sizes for students of the Division of Humanities and Social Sciences, as well as offices for professors.

These three buildings are on three sides of the Main Court, the focal point of the University, and all are connected by a tunnel.

The remaining buildings include a residence for 144 women students, a residence for 171 men, a cafeteria building, a classroom building, containing two lecture theatres and a bookstore, and a University Union for athletic and recreational activities.

Presently in the planning stage are a new building for the School of Engineering, and an addition to the Library.

Special facilities for student activities include rooms for Students' Council and student newspaper (The Carleton), games rooms, snack bar, lounges, a gymnasium, playing fields, and modest facilities for drama.

All students in the day and evening divisions of the University are members of, and pay the fees of, the Students' Association. The Students' Council, executive body of the Association, is elected by the students in the spring of each year.

Activities sponsored by the Students' Association, through its Council, include the publication of a weekly newspaper, *The Carleton;* dances and parties; women's, dramatics, radio, poetry, choral, language and camera clubs; chess, bridge, and sports clubs; commerce, science, and engineering societies; a debating society, a model parliament and political clubs; international affairs organizations; religious associations; welfare fund campaigns; and a wide variety of educational and recreational programs.

An Athletic Board, composed of representatives of faculty and students and responsible to the President, sponsors and supervises a program which includes the University band, recreational activities, intramural and intercollegiate activities.

STUDENT SERVICES

Health. Under the supervision of the University Medical Adviser, a Student Health Service is provided for the protection and promotion of the health of the student body. Its primary purposes are:

To supervise the health of all full-time students and to ascertain their fitness for academic work.

To investigate the physical fitness of all students who wish to participate in college athletic and recreational activities.

To provide a health consultation and advisory service for students. (Those with serious health defects are referred for treatment as necessary.)

To provide emergency treatment and medical care for athletic injuries and minor illnesses.

To plan a health education program designed to conserve and promote the overall health of the student body.

Prior to initial registration at the University, each full-time student is required to submit, on a personal health record form provided by the University, a certificate of medical examination performed by his family physician. Each year, in addition, a full-time student will submit evidence of having had a chest X-ray within six months prior to the opening of classes, or as an alternative to such chest X-ray a negative intracutaneous tuberculin skin test. Students electing to have the skin test in lieu of chest X-ray are advised to have such test conducted by the family physician at the time of the medical examination. Students who are

tuberculin positive will be required to undergo a chest X-ray as above. Chest X-rays may be arranged, free of charge, at the May Court Clinic, 374 Besserer Street, Ottawa, at any time after May 15. (Carleton students may be examined, except in July, on Tuesday, Wednesday, or Thursday, 2 to 4 p.m.). During the week of registration, September 12-18 inclusive, the Clinic will be set aside for Carleton students from 9-11:30 a.m. Unless the X-ray has been arranged through the University, it will be necessary for the student to furnish evidence of a negative report. X-ray facilities for part-time students will be made available by the University, and such students are encouraged to have an annual chest X-ray.

(Students who object to these examinations on religious grounds will provide the Medical Adviser with a written statement of the grounds on which they object, following consultation with the Medical Adviser.)

Each year before participating in University athletic activities, each student will report to the Medical Adviser and obtain a certificate of medical fitness which will be submitted to the Director of Athletics. The University is not responsible for expenses incurred as a result of injuries sustained by students while participating in athletic activities. Information regarding accident insurance is available in the Office of Student Affairs.

The Medical Adviser will re-examine any student he considers should be given further attention, as indicated by his review of pre-registration health record forms.

The Medical Adviser is available for consultation on Mondays, Wednesdays and Fridays from 12.30 to 1.30 p.m. The hours for the University Nurse are 10.00 a.m. to 2.00 p.m. Monday through Friday. The offices for both adjoin the Office of Student Affairs.

Employment. The Student Placement Service (Office of Student Affairs) offers assistance to students in obtaining part-time employment during the academic year, full-time employment during the summer vacation period, and permanent employment upon graduation. Assistance is offered to alumni of the University at any time. Students and graduates are asked to consult the Student Personnel Officer for placement assistance.

The Student Placement Service cooperates closely with the National Employment Service and the Civil Service Commission of Canada.

Housing. Two residence halls, one for men and one for women, will be ready for occupancy by September 1962. The two buildings will house 144 women and 171 men; there are some single rooms in each residence, but the majority are double rooms; all are furnished, including blankets and linens. Board and room for the academic session will be $700.00 for single, and $675.00 for double rooms. For application forms and information, write the Office of Student Affairs.

A housing registry, also, is maintained to assist those students who will be living "off-campus". Typical rates for such accommodations

are: Board and room $75.00 per month, room with two meals $70.00 per month, room and breakfast $35.00-$40.00 and room only $25.00-$30.00. Those interested in off-campus housing should contact Mrs. Jean Loates, Student Personnel Officer (Office of Student Affairs).

Food. The University Cafeteria, near the Science Building, also includes a snack bar.

Approximate Cost of One Year (8 months) at the University for a Student of Moderate Means

1. Tuition: Arts, Commerce, Journalism, Science . . . $ 465
   Engineering . . . . $ 525
2. Books, Instruments, and Supplies $40-100
   (The maximum named is typical for second-year Engineering Students)
3. Board and Room in Residence 675-700
4. Board and Room off-campus — 2 meals in home, luncheon
   in University Cafeteria . . . . $ 675
5. Clothes, Laundry, Entertainment, Transportation . . 220-300
                                          Total $1400-1625

Counselling and Guidance. Services available to students are:

1. A series of *orientation lectures* on study methods, the use of the university library, the university curricula, and related topics are arranged for new students in the day division during the week of registration.

2. All undergraduates enrolling in the day division for the first time at Carleton University are required to take any tests deemed suitable for the orientation program.

3. A library of *occupational information* is at the disposal of students, occasional lectures on specific occupational fields are arranged, and guidance in methods of seeking employment is provided.

4. Students are invited to seek assistance in their planning of educational programs, their choice of careers, and in the solution of their personal problems from: (a) their instructors, especially their designated Faculty Advisers; (b) administrative officers, particularly the Dean (Dr. James Gibson), the Associate Dean (Dr. M. S. Macphail), the Registrar (Dr. John McLeish), the Director of Student Affairs (Mr. Norman Fenn); and the Student Personnel Officer (Mrs. Jean Loates.)

5. Special and more extended counselling in career planning and personal problems may be obtained from Dr. F. R. Wake, Associate Professor of Psychology, and also from Mr. Fenn, Director of Student Affairs.

6. Faculty Adviser to Overseas Students: Dr. Charles Fleischauer is the Adviser to Overseas Students, and he may be consulted by appointment at his office in the Department of French.

7. The Registrar, Dr. McLeish, is available for consultation each Monday evening from 6.30 to 8 p.m., in addition to his regular daytime office hours.

MILITARY TRAINING

Each of the Services enrols undergraduates in reserve training programs designed to qualify cadets for commissions.

Each year is divided into two training periods, winter training of about two hours per week, and summer full-time training and service.

During the summer training period, cadets receive junior officers' pay (currently $225.00 per month); rations, quarters, transportation, uniforms, and medical services are provided free.

During the winter training period, cadets may receive up to 16 days pay per academic year.

Upon successful completion of training, cadets are commissioned, and upon graduation they are eligible for transfer to Regular or Reserve components.

REGULAR OFFICER TRAINING PLAN (R.O.T.P.)

The Armed Forces of Canada subsidize a limited number of undergraduate students who are willing to accept a military service obligation as a commissioned officer under the provisions of Regular Officer Training Plan.

University students found acceptable will be enrolled in the service of their choice (Royal Canadian Navy, Canadian Army (Regular) or Royal Canadian Air Force), as an officer cadet on a career basis. Upon achievement of degree status and fulfilment of military training requirements, Officer Cadets are promoted to commissioned rank and required to serve a minimum of three years immediately thereafter in the service which sponsored their training. After such service, an officer may be released at his own request providing a period of national emergency does not exist.

A student may qualify for subsidization under this Plan if he:

(a) is a Canadian citizen or British subject resident in Canada with the status of a landed immigrant;

(b) has attained his 16th but not his 21st birthday on the 1st of January of the year of enrolment in university;

(c) is physically fit for enrolment in the branch and service of his choice;

(d) is single and intends to remain so during his officer cadet training period.

Successful applicants will receive financial assistance as follows:

Pay [All officer cadets]   .   .$63.00 per month

Living Allowance .   .   . $65.00 per month

Holiday   .   .   .   .   . Up to 30 days annually with full pay and allowances, plus travelling time.

Tuition and other essential
university fees .   .   .   . Provided by Department of National Defence.

Text-book and Instrument
expenses   .   .   .   .   . $75.00 per year.

Medical and Dental care
expenses   .   .   .   .   . Provided by Department of National Defence.

Uniforms and
accoutrements .   .   .   . Provided by Department of National Defence.

Aircrew Trainees receive $75.00 per month flying pay while undergoing summer training.

Students interested in these training programs are requested to inquire of the service representatives listed below:

Navy: Staff Officer, U.N.T.D.,
           H.M.C.S. *Carleton*,
           Dow's Lake, Ottawa, Ontario; Tel. 9-4-5044

Army: Officer Commanding, Major J. M. Holmes, Department of
           Chemistry. CE 5-3773.
           C.O.T.C. Office, Telephone CE 4-4123

           Resident Staff Officer,
             Capt. J. G. R. L. Brisebois,
             CE 4-4123 or 9-2-7623

Air Force: Resident Staff Officer,
             112 University Squadron R.C.A.F.,
             162 Waller Street,
             Telephone 9-2-8615

TUITION FEES

The annual composite fee includes tuition, Students' Association, Athletics, and Health Service fees, and where applicable laboratory, graduation, and summer survey camp fees.

Arts, Commerce, Journalism, Science
Full-time students _____ $465.00
Part-time students (per subject) _____ $ 85.00
Engineering
Full-time students _____ $525.00

Included in the above composite fee are the following:

	Part-time per subject	Full-time
Students' Association	1.50	17.50
Athletics	.50	5.50
Health Services	—	2.00
University Union Contribution (as voted by student body)		10.00

GRADUATE FEE

See Graduate School, p. 76.

LATE REGISTRATION FEE

Full-time students:
$10 first week after registration period
$15 second week

Part-time students:
$1 (per course) first week after registration period
$2 (per course) second week

EXAMINATION FEES

(a) Supplemental and special final examinations, written at Carleton University, per paper_____ 5.00
(b) Examinations written at a university centre other than Carleton University, when permitted_____ 10.00

TRANSCRIPT FEE

For each transcript of academic record, except for the first two which are supplied free of charge_____ 1.00

DEFERRED PAYMENT FEE

Payable when fees are paid in:
(a) two instalments
$ .50 per half course   (5 courses — $5.00)
(b) more than two instalments
$1.25 per half course   (5 courses — $12.50)

Fees may be paid by any of the following plans:
1. Payment in full at the time of registration.
2. Payment in *two* instalments:
    (a) At registration—½ of the total tuition, *plus* Miscellaneous Fees (where applicable), and Deferred Payment Fee (see above).
    (b) At or before mid-session—the remaining half of the total tuition fee.
3. Payments in *five* instalments (winter session only):
    (a) At registration—⅕ of the total tuition, *plus* Miscellaneous Fees (where applicable), and Deferred Payment Fee (see above).
    (b) On the 15th of October, November, January and February—⅕ of the total tuition fee.

WITHDRAWAL AND REFUND

Students who are forced to withdraw from a course, or from the University, are required to notify the Registrar **in writing, or fill out the appropriate forms in his office,** and to give their reasons for withdrawal. The University assumes the obligation of carrying the student and accommodation on a yearly basis. Therefore:

(a) Credits or refunds will be granted as follows:
   (1) Cash refunds will be granted in cases where students are compelled to withdraw on account of serious and continued personal illness.
   (2) In case a student who is regularly employed during the day is sent out of the city permanently by his employer or compelled so to change his working hours as to prevent his continuing at the University, a refund will be granted.
   (3) Cash refunds may also be granted in cases where the student is compelled to withdraw for other personal reasons, provided that these reasons are satisfactory to the University authorities.
(b) Tuition not refunded or used may, if a certificate of credit is secured from the Bursar, be applied upon subsequent courses pursued in the University, provided such courses are taken within two years of the date of withdrawal of the student.
(c) Miscellaneous fees and Deferred Payment fees are not refundable.
(d) The portion of the tuition fee refunded is determined **by the date of written application for refund,** not the date of withdrawal.
(e) No application for withdrawal and refund will be considered if received after February 15 in the winter session, or after July 31 in the summer session.

GENERAL REGULATIONS

CLASSIFICATION OF STUDENTS

Students, whether in the day or the evening division, are classified as *undergraduates* or *graduate students* if they are properly matriculated for and proceeding to a degree, diploma, or certificate; otherwise they are classified as *special students*. They are considered to be *full-time* students when enrolled for four or more subjects in an academic session, and *part-time* students when enrolled for fewer than four.

APPLICATION TO COMMITTEE ON ADMISSION AND STUDIES

Students seeking special consideration under the regulations described in this section should make application to the Registrar, as the executive officer of the Committee.

CREDIT FOR SENIOR MATRICULATION COURSES

No more than five senior matriculation subjects taken in a secondary school may be counted toward a Carleton degree.

Except by permission of the Committee on Admission and Studies, no student will be given credit for senior matriculation subjects passed in a secondary school system after he has been registered as an undergraduate in Carleton University. Such permission is granted only rarely, and then only if the prescribed subject is not made available by the University. (This regulation governs students admitted as undergraduates in and after 1954.)

SUBSTITUTION FOR PRESCRIBED SUBJECTS

A student whose mother tongue is not English, and whose previous academic training has not been in English, may apply to the Committee on Admission and Studies for permission to substitute an approved course in the humanities for the prescribed course in a language other than English.

COURSE LOAD

Normal course load for a *full-time* student in the winter session is five full courses. Except in honours courses or engineering courses, no more than five full courses may be taken for credit in the winter session, unless by permission of the Committee on Admission and Studies. Students in the third and fourth years who wish to transfer from one course to another, must obtain the approval of their major departments. All transfers must be made *within two weeks following the opening of classes*.

A student who has been in full-time attendance at Carleton in a winter session may take a course in the following *summer session* only if it is required to make up a deficiency, is recommended by his major

department in lieu of a subject in the following winter session, or is taken as an extra subject for no degree credit.

Normal course load for a *part-time* student who is employed full time is one or two full courses in each winter session and one full course in each summer session. No more than two full courses may be taken for credit in a winter session and no more than one in a summer session, unless by permission of the Committee on Admission and Studies.

The Committee on Admission and Studies seldom will permit a student to take an extra course for credit unless in the previous academic session he has obtained better than average standing. With the consent of the instructor concerned, however, an undergraduate student (day or evening) enrolled for degree credit or a graduate student in the day or evening division may audit courses (i.e., attend without the privilege of writing examinations) concurrently with those being taken for credit, without the necessity of registering for or paying tuition for such audited courses.

ATTENDANCE

A student is expected to attend all lectures, discussion groups, seminars and laboratory periods of any course in which he is registered, whether such periods of work are formally scheduled by the University Registrar or informally announced by the instructor.

Each instructor will determine for his own courses the relation of class attendance to course grades, and whether attendance records shall be kept. Early in the session he will inform his students of his practice in this regard.

The Senate may, at any time, either during the term or after the close of the term, require any student to withdraw from the University if his conduct, attendance, work, or progress is deemed unsatisfactory.

INSTRUCTION IN THE USE OF THE LIBRARY

Every undergraduate entering the Qualifying University or First year in the day division will be required to complete satisfactorily an exercise in the use of the library, including the card catalogue, bibliographical sources, and standard reference works.

STANDING

A student's standing in his year's work will be determined not only by the results of mid-year and final examinations, but also by the work of the whole term or session, including consideration of class tests, laboratory work, essays, attendance, progress, and any other matters bearing on the candidate's worth as a student of the University.

Standing in all courses in the University is graded by the letters A, B, C, D, any of which may be accompanied by 'plus' or 'minus' modifications; or F (failure). For purposes of calculating 'equivalent' standing where this is mentioned in the calendar, point values ranging from 12 to 0 may be assigned to grades ranging from A+ to F.

To receive credit toward a degree, a candidate must obtain at least a 'D' grade in the work of each course. Candidates are to note, however, that they must also obtain a grade of 'C' or better in at least half of the courses taken at Carleton.

In order to enter Third year, a student must have at least 'C' or equivalent standing in the courses of his major subject or subjects.

In order to qualify for graduation, a student must have at least 'C' or equivalent standing in his major subject or subjects.

Students in the pass course who have on graduation a grade point average of at least 9.0 on all courses counted for credit, and who are recommended by their Major department, will be designated as graduating *with distinction*.

Specific regulations are stated in the outlines of the various degree programs, pp. 42-80.

Additional symbols used to indicate standing are as follows:

Aeg.—Aegrotat: absent from final examination but standing granted on basis of year's work; (a student granted *aegrotat* may write a special examination for a grade in the course.)

Pass—Passed supplemental examination but not otherwise graded. (Grade point value = 1.)

Abs.—Absent from final examination. (At the discretion of the instructor, an *undergraduate* or *graduate student* who is absent from the final examination may be graded 'F(ns)' if his term work has been quite unsatisfactory.)

F(ns)—Failure; no supplemental examination allowed. This is normally given when a student has unsatisfactory laboratory work and/or unsatisfactory term assignments, or if he receives a mark so low in the final examination that the privilege of a supplemental does not seem justified.

Wdn.—Withdrawn in good standing.

Students who wish to withdraw from courses must apply in writing to the Registrar, or fill out the appropriate forms in his office.

A student may not withdraw *in good standing* from any course for which he is registered, after February 15 in the winter session or July

31 in the summer session, except by permission of the Committee on Admission and Studies. If the student should withdraw from a course without such permission, and fails to write the final examination, his record will show that he was absent from the examination and he shall not have the privilege of writing a supplemental examination in that subject.

A candidate must obtain complete standing in the Qualifying University year before registering in the Second year, and complete standing in the First year before registering in the Third year of any course. Students transferring from other universities with credits toward their degree, but lacking early Carleton requirements, must consult the Registrar for their obligations under this rule.

FAILURE AND REPETITION

A student taking five or more subjects who fails in more than two subjects will be considered to have failed his year. A student taking fewer than five subjects who fails in more than one subject will be considered to have failed his year. In neither case will the student be permitted to write further examinations in any of the subjects of that year without repeating them, and will retain credit only in those subjects in which he obtained 'C' or higher standing. (For regulations governing promotion in Engineering, see pages 69-70.)

A student who has failed his year at Carleton University or elsewhere may apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year and must pass all courses taken (at regular or at supplemental examinations if allowed) in order to be restored to good standing. A student on probation who fails a course (including its supplemental examination if allowed) will be considered to have failed his year, and will normally forfeit his undergraduate status. A student placed on probation in the evening division must pass five courses in succession in order to regain good standing. Students must in all cases meet the terms of probation assigned by the Committee on Admission and Studies.

An undergraduate who has, in any event, failed his year twice forfeits his undergraduate status.

EXAMINATIONS

Mid-year examinations are held in all Qualifying University year and First-year lecture courses and in others at the discretion of the instructor, and final examinations in all courses, at the times listed under the Academic Year, p. 5. With few exceptions, a single, joint final examination is set for day and evening classes in the same subject—usually during morning

or afternoon hours. In full courses in which no formal mid-year examinations are held, mid-year grades will be given, when possible, on the basis of assignments, tests, and other term work during the first term.

Any student who is absent without good cause from a university examination, scheduled by the Registrar's Office, will not receive credit in the course. Such cause may be for certified medical disability, compassionate claim, or comparable reason acceptable to the Committee.

Special examinations. A student who, because of illness, has failed to write the scheduled mid-year or final examination in any course may apply for *aegrotat* standing or for permission to write a special examination provided he presents to the Committee on Admission and Studies the appropriate (University) medical certificate, duly completed and signed by his attending physician or surgeon. Students actually under medical treatment from an attending physician or surgeon in the period immediately prior to the examinations are reminded that it is their responsibility to notify the University that this situation exists if it is certain to affect their attendance at the examinations.

Reasons other than medical must also be fully documented for consideration by the Committee.

A student who, for such medical or for other acceptable reasons, has not written a final examination on the appointed date may be required, or may apply for permission, to take a *special final* examination. Special final examinations, and arrangements for taking them, may be authorized only by the Committee on Admission and Studies. These are written at the time of the supplemental examinations. For fee, see p. 33.

Applications stating cause must be submitted in writing to the Registrar, for consideration by the Committee on Admission and Studies. This must be done not later than one week after the date on which the examination was held.

Supplemental examinations. All supplemental examinations in courses taught during the winter session are held in late August, at the University, with the exception of supplemental examinations for January half-course finals — these supplementals are held in May. Summer course supplemental examinations are written in November. For exact dates, see The Academic Year, p. 5. Fees are shown on p. 33.

An undergraduate student who has been graded 'F' on a final examination, but has not failed his year, may write a supplemental examination in that subject at the time of the next regular supplemental examinations. In such cases the supplemental examination ordinarily will be graded only 'Pass' or 'Failure'.

A student who fails a course primarily because of unsatisfactory laboratory and/or term work may be graded 'F(ns)', meaning that he

may not write a supplemental examination in that course. Likewise, he may receive this grade if he has obtained a mark so low in the final examination that the privilege of a supplemental does not seem justified. The privilege of writing supplemental examinations will be thus denied only in such cases, and the student shall have the right of appeal to the Committee on Admission and Studies.

A student wishing to raise a grade in a course already passed may apply to the Committee on Admission and Studies for permission to write a *special supplemental* examination. A special supplemental examination is the same as an *ordinary* supplemental examination except that it is graded on the grading scale.

Such a student, if granted permission to rewrite a subject for higher standing, may do so, once only, at the next regularly scheduled supplementary examination period. Students are advised that when they write special supplemental examinations for the purpose of raising their standing, the final grade assigned in any subject will be based on the whole year's work, including the supplemental, and that the grade obtained in the supplemental may be the grade retained even when it is lower than the grade derived from the previous final examination.

If a supplemental examination is failed, the student will be required to repeat the course before coming up for examination in that course in any subsequent year.

No student may write supplemental (including special supplemental) examinations in more than two subjects (two full courses or the equivalent in half-courses) in any year.

Official course grades are released only by the Registrar. Year-end reports are first posted, and then mailed to students as soon as possible after the release of grades has been authorized. Upon the request of a student, a duplicate of his report will be sent to his employer or another designated person.

PROFICIENCY IN ENGLISH

All students in the Qualifying University year in Arts, Journalism, Commerce, and Science take English 10 (English Literature and Composition). If this course is not passed in the first year, it must be repeated until passed. Thereafter, in any year of course, a student may be required to receive additional tuition in the use of the English language as prescribed by the Department of English, to which he may be referred, at any time, by an instructor in any department.

LIBRARY REGULATIONS

All persons taking courses in the University, and all graduates of the University are entitled to use the library the year round.

Most books may be borrowed for three weeks. Some books are placed on 'Reserve' and may be borrowed over night or for one week. If they are not returned when due, a fine of 25c for the first hour or part of an hour, and 10c for each hour or part of an hour thereafter, is charged. When books borrowed for three weeks are kept long overdue, they become subject to reserve book fines.

Reference books may not be taken from the library.

Library hours are listed on the inside cover.

Every undergraduate entering the Qualifying University or First year in the day division will be required to complete satisfactorily an exercise in the use of the library, including the card catalogue, bibliography sources, and standard reference works.

ACADEMIC COSTUME

For the Bachelor's and Master's degrees, the academic dress of Carleton University is of the design specified in the intercollegiate code. The hood is of *simple* shape, made of black *stuff*, and lined in silver with two chevrons of equal width inserted, that near the border, red, and that near the peak of the cowl, black. The border of the hood denotes the degree awarded, according to the following colour combinations: Arts—white; Journalism—white with a cord of black superimposed upon the border, set in $\frac{1}{4}''$ from the lower edge; Science—golden yellow; Commerce—drab; Engineering—orange. The Bachelor's hood is approximately three feet in length, with a two inch border; the Master's, three and a half feet, with a somewhat wider border, and open to expose more of the lining.

The gown of the honorary Doctor of Laws degree is of the type described as *full*, of ankle length, and of a royal blue colour with revers and sleeves of a contrasting shade of light blue. The hood, made of the same royal blue material as the gown, with a purple border, is of the full rounded shape with a tippet, and open to the base so that the entire lining, which is similar to that of the lower degrees, is fully visible.

ARTS

Admission Requirements

(a) *To the Qualifying University Year* of courses leading to the Bachelor of Arts degree:

Junior Matriculation — the Ontario Secondary School Graduation Diploma in the General Course (Grade XII), or an equivalent certificate, with a general percentage of at least 70%. In cases where provincially administered examinations are written, the general average will be 65%. Some students with a slightly lower average may be admitted if they can satisfy the University that they have a reasonable chance of success.

Standing is required in the following subjects:

1. English.
2. Mathematics (Algebra and Geometry).
3. History.
4. A language other than English.
5. Science (Physics and Chemistry; or Agricultural Science, Parts I and II) *or* an additional language.
6. Any *one* of: Music, Art, Geography, Agricultural Science, an additional language, or an additional science.

Mature Matriculation—A person over the age of twenty-three years who, though lacking the admission requirements specified above, can give evidence of the likelihood of success in university studies, may be admitted *on probation*. If he completes successfully the subjects of the Qualifying University year, his matriculation will be confirmed and he will be given credit for the year. Persons interested should consult the Registrar[1].

(b) *To the First Year* of courses leading to the Bachelor of Arts degree:

Senior Matriculation—(1) Junior Matriculation or Mature Matriculation as prescribed above, and, in addition, (2) completion of the Qualifying University year; or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII), or an equivalent certificate, with a 60% general average. Applicants with a slightly lower average may be admitted if they can satisfy the University that they have

[1]Note that this provision applies to persons wishing to study *full-time*. Others can test their capability through taking courses as *special* students in the evening division.

a reasonable chance of success. Standing is required in the following five subjects:

1. English Composition and Literature.
2. A language other than English.
3. Mathematics (2 or 3 of Algebra, Geometry, Trigonometry) *or* an additional language.
4. A science: Biology or Chemistry or Physics.
5. One of: History or Geography, or an additional language, or an additional science.

See also p. 35, *Credit for Senior Matriculation courses.*

(c) *To the Second or subsequent years* of courses leading to the Bachelor of Arts degree:

Applications for admission to the Second or subsequent years will be evaluated on their merits, and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

● *Bachelor of Arts*—(Offered in both day and evening divisions).

Length of course. Candidates for the Pass B.A. degree will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also *Course Load*, p. 35.

Course selection. The B.A. course is designed to provide opportunity for a liberal education, including specialization in one subject of study, called a *major*. The choice of a major will normally be made upon entry to the Second year, in consultation with the department or departments concerned, in any subject listed below. A *combined major* in two related subjects may be taken, with the consent of the departments concerned.

For 1962-63 the subjects are as follows:

Classics (Latin, Greek), Economics, English, French, German, Geography, History, Mathematics, Philosophy, Political Science, Psychology, Russian, Religion, Sociology, Spanish. (In certain cases, and with consent of the Department of Biology, a major in Biology in the B.A. course may be taken.)

Courses will be selected from those listed under Details of Subjects, pp. 81ff., as follows:

Qualifying University Year

1. English 10.
2. A language other than English (a course numbered between 10 and 99).
3. Two or three of Mathematics 15*, 25*, 35* or Mathematics 30 *or* one of French 10, German 15, Greek 15, Italian 15, Latin 10, Russian 15, Spanish 15.
4. A science: Biology 20 or Chemistry 10 or Physics 10 or Geology 100.
5. History 10.

First Year

Either one or two of the requirements specified below may be deferred until the following year, to permit substitution in the First year of an additional course or courses chosen from Groups 3 or 4, or Religion 100 or 120.   (Pre-medical students are referred to p. 84.)

1. A course in English literature: English 100 or 165. (Students choosing English as a major will take English 165.)
2. An introduction to the problems of thought and conduct: Philosophy 100.
3. An introduction to the study of society: *one* of Economics 100, History 100 or 115, Political Science 100, Psychology 100, Sociology 100.
4. A language other than English: *one* of French, German, Greek, Italian, Latin, Russian, Spanish (a course numbered in the 100's. Note that except in French and Latin, this may require a pre-requisite course numbered 15, which will carry a credit.)
5. *Either*: Mathematics 130 or 100
   or: A science course chosen from Biology 20 or 100, Chemistry 100, Geology 100, Earth Science 100 or Physics 100.

Second and Third Years

A total of ten courses, five in each year: a minimum of four (five, if one is not taken in First year) in the student's major. The others are to be chosen with the approval of the department or departments in which the major is taken.

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*An asterisk attached to a course number indicates a half-course; see p. 81.

Summer Reading Requirements

Students taking the course program leading to the B.A. are expected to fulfil summer reading requirements as announced, and should inform themselves of the requirements specified by each major department. *The degree will not be conferred upon students failing to meet this obligation.*

Proficiency in English. See p. 40.

Standing. General regulations regarding standing are stated on p. 36ff. In addition, a candidate for the B.A. degree must be recommended for graduation by his major department.

A student clearly below the required minimum standard at the end of his penultimate year prior to graduation may be required to withdraw from his major field by his department.

Honours Requirements in Arts (See p. 73ff.)

◉ *Bachelor of Commerce* (Offered in both day and evening divisions)

The course leading to the degree of Bachelor of Commerce is designed primarily to provide an education with some concentration in economics and an introduction to those subjects likely to be of particular interest to students contemplating a business career. Because the aims of students differ widely, and because specific training can be gained more effectively in business itself than in academic courses, the Commerce course contains no specialized training in the techniques of business management and administration.

Admission Requirements

(a) *To the Qualifying University Year* of the course leading to the Bachelor of Commerce degree:

Requirements are the same as those for admission to the equivalent year of courses leading to the Bachelor of Arts degree .

(b) *To the First Year* of the course leading to the Bachelor of Commerce degree:

Senior Matriculation—(1) Junior Matriculation or Mature Matriculation as prescribed above (on p. 42) and, in addition, (2) completion of the Qualifying University year; or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII) or an equivalent certificate with a 60% general average. Students with a slightly lower average may be admitted if they can satisfy the University that they have a reasonable chance of success. Standing is required in the following five subjects:

1. English Composition and Literature
2. A modern language other than English
3. Mathematics (Algebra, Geometry, and Trigonometry)
4. A science: Biology or Chemistry or Physics
5. One of History or Geography, or an additional language, or an additional science.

Credit for Senior Matriculation Subjects.

(c) *To the Second and Third Years* of the course leading to the Bachelor of Commerce degree:

Applications for admission to the Second or Third years will be evaluated on their merits, and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

Length of course. Candidates for the Bachelor of Commerce degree must take a total of 20 courses after Junior Matriculation or 15 after Senior Matriculation. See also *Course Load*, p. 35.

Course selection. Courses will be selected from those listed under Details of Subjects, p. 81ff., as follows:

QUALIFYING UNIVERSITY YEAR

1. English 10
2. French 10 or a course numbered between 10 and 99 in another modern language[1]
3. Mathematics 15*, 25* and 35* or Mathematics 30
4. A science: Biology 20 or Chemistry 10 or Physics 10 or Geology 100
5. History 10

FIRST YEAR

1. English 100 } Both must be taken
   or Philosophy 100 } before graduation.
2. A further course in the modern language taken in first year *or* a science: Biology, Chemistry, Geology, Physics, or Earth Science.
3. Economics 100
4. Accounting 100[2]
5. Mathematics 130 *or* 100, *or* Political Science 100, *or* Sociology 100, *or* another course approved by a member of the Committee on Commerce Studies.

SECOND YEAR

1. Economics 200
2. Economics 210
3. Economics 220
4. Accounting 200[2]
5. Any other course approved by a member of the Committee on Commerce Studies.

THIRD YEAR

Five courses chosen as follows:

1. Economics 225 or Economics 325

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[1]See also p. 35, *Substitution for Prescribed Subjects.*
[2]With the permission of the Chairman of the Committee on Commerce Studies, students may postpone Accounting 100 until Second year and Accounting 200 until Third year in order to substitute an approved course.

2. At least one Economics course in category 4 of the Economics program (p. 98).
3. Remaining courses to be approved by a member of the Committee on Commerce Studies.[1]

Commerce students wishing to discuss their programs of studies should consult the Chairman of the Committee on Commerce Studies, who is their faculty adviser.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting degrees—Chartered Accountant (C.A.), Certified Public Accountant (C.P.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.)— should consult the Chairman of the Economics Department before entering the final year of the Commerce course. Any other students who are interested in professional accounting careers are referred to the special circular covering the various accounting degree-granting bodies. These students also may wish to consult the Professor of Accounting.

Proficiency in English.   see p. 40.

Summer Reading Requirements.   Students taking the course program leading to the B.Com. are expected to fulfil summer requirements as announced. *The degree will not be conferred upon students failing to meet this obligation.*

Standing. Students *will not normally be permitted to enter the Second year of the Commerce program unless they have obtained a grade of 'C' or better in each of Economics 100 and Accounting 100.*

Students who have failed to achieve this standard and wish to continue in Commerce should consult the Chairman of the Committee on Commerce Studies immediately upon receiving their results.

General regulations regarding standing are stated on p. 36. For purposes of the Commerce course, these regulations are to be interpreted as follows:

(i) A candidate for the B.Com. degree must obtain a grade of 'C' or better in at least half of the courses taken at Carleton University for the degree.

(ii) He must obtain a grade of 'C' or equivalent on any six of his Economics and Accounting courses.

(iii) He must obtain a grade of 'C' or equivalent on any four such courses before being admitted into Third Year Commerce.

In addition, candidates must be recommended for graduation by the Committee on Commerce Studies.

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[1]In addition to courses continuing from those taken in earlier years, students might wish to consider Commercial Law 100, *or* Public Law 350, *or* Mathematics 235*.

JOURNALISM

DIRECTOR OF THE DEPARTMENT:
Wilfrid Eggleston, M.B.E., B.A., F.A.G.S.

ADVISORY COUNCIL

T. J. Allard, Executive Vice-President, *Canadian Association of Broad-casters.*

Raymond Daniell, Chief of Canadian Bureau, *The New York Times.*

Guy de Merlis, French Editor, *The Labour Gazette.*

D'Arcy Finn, Executive Editor, *The Ottawa Citizen.*

Michael Barkway, Ottawa journalist and broadcaster.

Norman M. MacLeod, Director, *United Press International (BUP)*

Dan C. McArthur, *Canadian Broadcasting Corporation.*

I. Norman Smith, Associate Editor, *The Ottawa Journal.*

A. Davidson Dunton, President of the University.

Wilfrid Eggleston, Director of the Department.

James A. Gibson, Dean, Faculty of Arts and Science.

J. A. B. McLeish, Registrar of the University.

● *Bachelor of Journalism* (First two years offered in both day and evening divisions; last two years offered in day division only)

The course in Journalism at Carleton University has been built on the conviction that what today's journalist needs most of all is a first-rate education, supplemented by thorough training in the basic skills of investigation and communication. The value of the journalism course arises largely from its intimate integration with the college studies in the liberal arts. The modern journalist is required to report and comment upon the whole range of social, political, economic, and cultural activities of his time. Before he can even ask intelligent questions about such matters, he must be grounded in the humanities and the social sciences. Nor can he know too much about a wide range of other fields of enterprise and learning.

The reporter is the link or bridge between the world of activity and investigation, and the great masses of readers and listeners. To be effective he must, therefore, master some of the fundamental arts of seeing, digging, interviewing, reading, organizing, reporting, and editing. Adequately equipped, he can readily apply his talents to any field of journalistic activity. The good newspaperman is noted for his ability to lay hold of information, and to see the value of the facts and opinions he acquires.

The course in Journalism at Carleton University thus emphasizes liberal scholarship and basic skills, in the belief that there are few practical

applications of a specialized nature which cannot be subsequently acquired in a few weeks of actual work. While an array of "shop" courses in practical vocational training might appear to give more immediately useful crafts to the prospective journalist, it is assumed that no amount of "shop" training will carry a "cub" far if he lacks a broad background of liberal education and the intelligence to grasp and report the complex phenomena of modern society.

The opportunities in the national capital for the training of newspapermen and women are exceptional. The members of the parliamentary press gallery and staffs of the Ottawa newspapers, the press attachés of diplomatic missions, top executives in the radio broadcasting field, the public relations officers of government departments, and headquarters personnel of national associations are among the resources from which Carleton University can draw for guest lecturers and teaching material. Ottawa is the repository and headquarters of information upon almost every conceivable national and international topic. It is rich in cultural life. It is not going too far to say that residence for two or three years in the national capital can of itself be an education to anyone who purposes to make writing his or her career.

Admission Requirements

(a) *To the Qualifying University Year* of the course leading to the Bachelor of Journalism degree:

Requirements are the same as those for admission to the Qualifying University Year of courses leading to the Bachelor of Arts degree (see p. 42, Calendar).

(b) *To the First Year* of the course leading to the Bachelor of Journalism degree:

Senior Matriculation—(1) Junior Matriculation or Mature Matriculation as prescribed above and in addition, (2) completion of Qualifying University Year; or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII) or an equivalent certificate with a 60% general average. Applicants with a slightly lower average may be admitted if they can satisfy the University that they have a reasonable chance of success. Standing is required in the following five subjects:

1. English Composition and Literature.
2. A language other than English.
3. Mathematics (2 or 3 of Algebra, Geometry, Trigonometry) *or* Latin.
4. A science: Biology or Chemistry or Physics.
5. One other, preferably History.

See also p. 35, *Credit for Senior Matriculation Subjects*.

(c) *To the Second and Third Years* of the course leading to the Bachelor of Journalism degree:

Undergraduates applying for admission to advanced standing with allowances on credits gained at their original college or university may be admitted to the Second or Third year, if their academic record is accepted as at least equivalent to the completion of the two previous years of Journalism in Carleton University. Normally, such applicants should offer standing in at least two of the following subjects in their previous work: Canadian History, Psychology, Economics, Political Science. Credit for courses previously taken will be arranged on application, subject to the stipulation that a minimum of a full year's work of at least the last five courses must be taken at Carleton University in order to qualify for the Bachelor of Journalism degree.

(d) *To the B.J. Course as a post-graduate year*:

The holder of a bachelor's or master's degree in Arts, Science, or Commerce may be permitted to enroll in the five Journalism subjects normally taught in the Second and Third years (Journalism 210, 220, 330, 340, 350), and thus qualify for the degree Bachelor of Journalism in one academic year. He may be required to take, in addition, certain of the courses in the liberal arts which are prescribed for undergraduates in Journalism, if the pattern of his previous studies is deficient in such background.

NOTE: Journalism students are urged to become reasonably proficient on the typewriter as soon as possible. All assignments in the courses Journalism 210, 220, 330, 340 and 350 (which are taken in the Second and Third years) will be done by typewriter.

Course Requirements

Length of Course. Candidates for the Bachelor of Journalism degree must take a total of twenty courses in four years if admitted by Junior Matriculation, or fifteen courses in three years if admitted by Senior Matriculation.

Course Selection. The course leading to the degree of Bachelor of Journalism will consist of subjects selected from those listed under Details of Subjects, as follows:

Qualifying University Year

1. English 10 (English Literature and Composition).
2. French 10 (Readings in Modern French).
   or a course numbered between 10 and 99 in another language[1].
3. Mathematics 30
   or Latin 10 (First-year Latin).
4. A science: Biology 20 or Chemistry 10 or Physics 10 or Geology 100.
5. History 10 (Main Directions in Modern History).

First Year

1. English 100 (English Authors from Chaucer to T. S. Eliot).
2. A further course in the language taken in first year.
3. An approved course in History.
4. Philosophy 100 (Introduction to Philosophy — which must be taken in Second year if not in First)
   or Psychology 100 (General Psychology).
5. Economics 100 (Principles of Economics).
   or Political Science 100 (Introduction to Political Science)
   or Sociology 100.
6. Journalism 110 (Preparatory Lectures for First-year Journalism Students)—a non-credit course.

Second Year

1. Journalism 210 (Introduction to Journalism).
2. Journalism 220 (Fundamentals of Reporting).
3. History 230 (Canada from 1791)[2].
4. An approved option[3] (Philosophy 100, if not already taken).
5. An approved option[3].

Third Year

1. Journalism 330 (Editing).
2. Journalism 340 (Interpretative Reporting).
3. Journalism 350 (Career Seminar in Journalism).
4. An approved option[3].
5. An approved option[3].

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[1] See also p. 35, *Substitution for Prescribed Subjects.*

[2] A student who comes to the University from another country may be advised to take a different sequence in History.

[3] The subjects which will be recommended to students for their choice of options include: Political Science, Economics, Sociology, Philosophy, Canadian Geography, History, English, Social Psychology, French.

Proficiency in English. See p. 40.

Standing. General regulations regarding standing are stated on p. 36. In addition, a candidate for the B.J. degree must have at least 'C' or equivalent standing in his Journalism courses, and specifically must obtain at least a 'C' grade in Journalism 330, 340, and 350, and be recommended for graduation by the Department of Journalism. If after the regular examinations in any year a student is below that standard, he is advised to raise his grades in some subjects by writing special supplemental examinations.

PUBLIC ADMINISTRATION

DIRECTOR OF THE SCHOOL: R. Oliver MacFarlane, M.A., Ph.D.

ADVISORY COUNCIL

R. D. Boyd, Director, Personnel Branch, Post Office Department
R. B. Bryce, Clerk of the Privy Council, and Secretary to the Cabinet
G. F. Davidson, Deputy Minister of Citizenship and Immigration
J. Y. Harcourt, Executive and Professional Development Officer, Civil
    Service Commission
Hon. S. H. S. Hughes, Chairman, Civil Service Commission of Canada
E. F. Sheffield, Research Officer, Canadian Universities Foundation

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A. Davidson Dunton, President of the University
James A. Gibson, Dean, Faculty of Arts and Science
R. Oliver MacFarlane, Director of the School
Donald C. Rowat, Professor of Political Science
J. A. B. McLeish, Registrar of the University
Pauline Jewett, Associate Professor of Political Science

THE PROGRAM

The rapid growth in government services during the last half century has increased the responsibilities and complicated the problems of public employees. The realization has been growing, therefore, that public administrators, whether federal, provincial, or municipal, can profit from a special type of education. Carleton University has been attempting to meet this need by offering programs of study as preparation for public administration.

Assisted by a $200,000 grant from The Atkinson Charitable Foundation, the School of Public Administration was established September 1, 1953, to coordinate the various programs of study and to promote further development and research in the field. Four programs are now offered: the first leads to a Bachelor of Arts degree with Honours in Public Administration; the second to an undergraduate Certificate in Public Service Studies; the third to a graduate Diploma in Public Administration; and the fourth to the degree of Master of Arts in Public Administration.

The Honours B.A. program is planned on the assumption that the most suitable education for a person desiring to be a capable public administrator is broad and general in base, with specialization at a later stage. While it is designed to be of particular use to students contemplating careers in public employment, it also provides a sound general education for those considering the legal profession or business.

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The Certificate and Diploma programs, on the other hand, will be most helpful to those who desire training in fields directly related to public administration. The Certificate course is designed to encourage public servants without university training to broaden their background. Since they are allowed degree credit for this work, they will also be encouraged, upon its completion, to continue toward a bachelor's degree. The graduate Diploma course, requiring more advanced studies, is available both to public servants in the evening division and to full-time day students. The M.A. program is offered to full-time students, but may be taken by part-time students, subjects to conditions set forth on page 59. Several scholarships are available for M.A. candidates, and for both full- and part-time candidates enrolling for the graduate Diploma, and for full-time study toward the Certificate.

Public employees not interested in registering for studies leading to a degree, a certificate, or a diploma should note that they may take, as *special* students, any of the subjects listed in Public Administration programs for which they have the requisite background. Their attention is directed also to non-credit extension courses related to Public Administration which are offered from time to time by the University. Details may be obtained from the Office of the Registrar.

As Carleton University is located in the capital city and enjoys close relations with many government agencies, students of public administration may profit greatly from the unique advantages thus offered. Such institutions as the Library of Parliament, the Public Archives, the Dominion Bureau of Statistics, and the specialized libraries of the several government departments, all offer unusual opportunities for study in Ottawa. Advice and assistance are obtained from the Civil Service Commission and from officials of other government departments and agencies. Experienced public administrators give lectures or lead seminar discussions from time to time.

UNDERGRADUATE COURSES

● *Bachelor of Arts with Honours in Public Administration* (Qualifying and First years offered in both day and evening divisions; last three years offered in day division only.)

Course Requirements

Candidates for the degree of Bachelor of Arts with Honours in Public Administration must satisfy all requirements for the degree of B.A. with Honours.

Course selection. The work of this course involves prescribed studies in Political Science, History, Economics, and Public Law, and in approved options, as outlined below:

First Year

Students intending to enter Honours Public Administration in the Second year will take the Honours First year in the Social Sciences (see page 74), or they may enter from the Pass Course if at least second class standing has been obtained. They are advised, however, to include Political Science 100 (Introduction to Political Science) in the First year, and by the end of that year should have a reading knowledge of French.

Second Year

1. Political Science 210, 310, or 220
2. Economics 100 (Principles) or, if already taken, an option
3. History 230 (Canada from 1791)
4. Political Science 230 (History of Political Thought)
5. An approved option

Third Year

1. Political Science 340 (Problems in Public Administration)
2. Political Science 300 (Canadian Federalism)
3. Public Law 350 (Elements) or Political Science 380
4. Economics 210 (Monetary Theory)
   or Economics 225 (Economic History)
   or Economics 325 (Economic Development of Canada)
   or Economics 220 (Statistics)
5. An approved option

Fourth Year

1. Political Science 430 (Modern Political Thought)
2. Political Science 400 (Government of Canada)
3. Political Science 490 (Research Tutorial)
4. Economics 440 (Public Finance)
   Economics 450 (Economic Fluctuations and Stabilization Policy)
   or Psychology 340 (Personnel Psychology I)
   or Psychology 345 (Personnel Psychology II)
   Sociology 364 (Political Behaviour)
   or Sociology 245 (Sociology of Work)
   or Sociology 250 (Sociology of Power and Stratification)
5. An approved option

● *Certificate in Public Service Studies* (Offered in both day and evening divisions.)

This course is designed primarily for public employees who seek special training in public service subjects at the undergraduate level. Subjects taken for the Certificate may be credited toward a bachelor's degree, but a student must complete at least five of the subjects required for the degree *after* the award of the Certificate. Candidates for the Certificate, full-time, are invited to inquire about possible financial aid.

Admission Requirements

Junior matriculation (see p. 42); but the cases of experienced applicants without junior matriculation will be considered on their merits and the completion of certain subjects at Carleton may be required before admission. Candidates may be admitted with advanced standing, but must complete at least five courses for the Certificate in Carleton University.

Course Requirements

The following courses are required and the following order is suggested.

1. Political Science 100 (Introduction to Political Science)
2. Economics 100 (Principles of Economics)
3. History 230 (Canada from 1791)
   or History 325 (The Economic Development of Canada)
4. Political Science 340 (Problems in Public Administration)
5. Political Science 300 (Canadian Federalism)
   or Public Law 350 (Elements of Public Law)
6. One other, chosen in consultation with the Director according to the needs of the student.

Standing. A candidate for the Certificate must obtain a grade of 'C' or better in at least half of the courses taken in Carleton University for the Certificate.

DISCONTINUED PROGRAMS:

Bachelor of Public Administration

Bachelor of Arts with Certificate in Public Administration

● *Graduate Diploma in Public Administration* (Offered in both day and evening divisions)

This course is designed for those in or planning to enter the public service who already have a university degree, but desire further training in the fields directly related to public administration.

Admission Requirements

A.   A bachelor's degree from a recognized college or university, including (with better than average standing) the following undergraduate courses, or their equivalents:

   a.   Political Science 100 (Introduction to Political Science)

   b.   Economics 100 (Principles of Economics)

   c.   History 230 or 325 (Canadian History)

   d.   Two other courses approved by the Director, in the social sciences or related fields. Experience in public service may be accepted in lieu of *one* of these two courses.

An applicant who lacks one or more of these prerequisite courses may be allowed to take one as No. 5 of the course requirements, and may make up the remainder of his deficiencies at the University. Ordinarily he would not be required to take more than two courses in addition to the requirements for the Diploma. A prospective full-time student with only one or two prerequisites to make up may take one of these during the summer prior to entry and/or may be permitted to take one as an additional course during his full-time year;

or

B.   A bachelor's degree in any honours course requiring four years from senior matriculation, or a bachelor's degree and an additional year of post-graduate work with better than average standing. Students who have not obtained standing in Political Science 100, Economics 100, and History 230 or 325, or their equivalents, may be required to take one of these in addition to the requirements for the Diploma.

Course Requirements

   Five courses are required:

   1.   Political Science 340 (Problems in Public Administration)

   2.   Political Science 230 or 430 (Political Thought)

3. Political Science 400 (Government of Canada)
    or Political Science 500 (Provincial and Municipal Government)

4. Political Science 300 (Canadian Federalism)
    or Public Law 350 (Elements)
    or Public Law 550 (Administrative)
    or Economics 440 (Public Finance)
    or Economics 450 (Economic Fluctuations and Stabilization Policy)

5. An approved social science, preferably chosen from: Economics 220, 430, 440, 450, Public Law 350, 550, Sociology 250, 300, 340, Psychology 340, 345, or the courses in Political Science.

All five courses for the Diploma must be taken at the University. If a student has already taken any of these courses (or their equivalents) in qualifying for admission to the Diploma program, he must substitute others approved by the Director. To meet the needs of foreign students, variations from the course requirements may be approved by the Director.

Standing. Candidates for the Diploma must obtain an average of at least second class standing in the courses counted for the Diploma, with no grade below 'C'.

- *Master of Arts in Public Administration*

    This program is normally offered in Day Division only, but it may be taken in Evening Division with the approval of the Director under the following conditions:

    1. Admission under a or b (below).
    2. Passing a comprehensive examination prior to the conferring of a degree.
    3. Completing all requirements in a period not exceeding five years.
    4. Having previously completed in B.A. or graduate program at least one year of university residence.

Admission Requirements

a. A bachelor's degree, *and* the graduate Diploma in Public Administration with 'B' or better grades in at least four courses;

or

b. A bachelor's degree in any honours course requiring four years from Senior Matriculation with second-class honours or better, or a bachelor's degree and an additional year of post-graduate work with at least second class standing. If standing has not been

obtained in Introduction to Political Science, Economic Principles, Canadian History, Public Administration, and Political Theory, a student may be required to complete some or all of these courses with 'B' or better grades, prior to undertaking the course requirements listed below. A prospective full-time student with only one or two prerequisite courses to make up, may take one of these during the summer prior to entry and/or may be permitted to audit or take one as an additional course during his full-time year.

If a student is without standing in all or most of these courses he will be required to register for the Graduate Diploma (see Diploma Admission Requirements, B.). An evening student may then, upon successful completion of three of the above courses with 'B' or better grades, apply for admission to the M.A. program. (A full-time student in this category would be allowed to choose his Diploma courses so that one or two of them could count toward his M.A. Upon the successful completion of his full-time year, he could then either take the Diploma or apply for admission with advanced standing to the M.A. program, which could then be completed in the Evening Division.)

Course Requirements

1. Political Science 540 (Theory and Practice of Administration)
2. Public Law 550 (Administrative). (This course must be elected if not previously taken.)

   or Economics 450 (Economic Fluctuations and Stabilization Policy)
3. Political Science 400 (Government of Canada)

   or Political Science 500 (Provincial and Municipal Government)
4. Political Science 590 (Directed Study in a Selected Field) ⎫
5. *and* An approved social science ⎬ *or* a Thesis

Standing. A grade of 'B' or better must be obtained in each course counted for the M.A. degree.

SCIENCE

Admission Requirements

(a) *To the Qualifying University Year* of courses leading to the Bachelor of Science degree:

Requirements are the same as those for admission to the Bachelor of Arts degree (see page 42), or by Mature Matriculation as prescribed above (page 42).

(b) *To the First Year* of courses leading to the Bachelor of Science degree:

(1) Successful completion of the Qualifying University year with an average of 'C' grade or better in the mathematics and science subjects taken.

(2) The attainment of the Ontario Secondary School Honour Graduation Diploma (Senior Matriculation — Grade XIII) or an equivalent certificate with a 60% general average, and with at least third class honours in the Mathematics and Science subjects taken. Students with a slightly lower *general* average may be admitted if they can satisfy the University that they have a reasonable chance of success, and provided that laboratory space is available. Standing is required in the following:

1. English Composition and Literature
2. A language other than English
3. Mathematics (Algebra, Geometry, and Trigonometry)
4. ⎫
5. ⎭ Two of: Physics, Chemistry, Biology

See also p. 35, *Credit for Senior Matriculation Subjects.*

(c) *To the Second or subsequent years* of courses leading to the Bachelor of Science degree:

Applications for admission to the Second or subsequent years will be evaluated on their merits and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

● *Bachelor of Science*

Length of course. Candidates for the B.Sc. pass degree will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also *Course Load*, p. 35.

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Candidates for the B.Sc. Honours degree will take an additional year of study — see p. 73ff. and departmental announcements p. 81ff.

Course selection. The B.Sc. course affords opportunity to specialize in one science subject, called a *major,* and to a lesser extent in a second subject, called a *minor.* The choice of a major normally will be made before the student begins his Second year, in consultation with the department concerned.

Standards of Entry to a Major Subject: Students planning to major in a science subject will normally do so upon successful completion of the First year with an average standing of at least 'C' grade in mathematics and science, and upon application to the chairman of the department of their choice.

Available Evening Courses. In several departments, most of the more advanced courses will normally be given, in whole or in part, in the day division only. Evening division candidates may therefore have to arrange to take certain of their major courses in the daytime. Candidates are advised to consult their major departments as early as possible to arrange their programs.

Subjects in which majors may be taken are: Biology, Chemistry, Mathematics, Geology, Physics.

Courses will be selected from those listed under Details of Subjects, p. 81ff., as follows:

QUALIFYING UNIVERSITY YEAR

1. English 10
2. A language other than English (a course numbered between 10 and 99)[1]
3. Mathematics 15*, 25*, 35*; or 30
4.
5. } Two of: Biology 20, Chemistry 10, Physics 10, Geology 100

FIRST YEAR

1. One of: Classical Civilization 200 or 201, English 100, Philosophy 100
2. Mathematics 100 (or 130 with permission of major department)

[1]See also p. 35, *Substitution for Prescribed Subjects.*
*An asterisk attached to a course number indicates a half-course, see p. 81.

3. ⎡Three of:
4. ⎨ (a) Biology 20 or 100
5. ⎣ (b) Chemistry 10 or 100
    (c) Geology 100
    (d) Physics 10 or 100

Second and Third Years

A total of ten courses, five in each year: normally at least four more courses in the student's major, at least two more in a minor field, and at least one course each year chosen from subjects other than the natural sciences and mathematics. The program of each student in the Second and Third years is under the direct supervision of a full-time member of the department in which he takes his major.

Language requirement. Before graduation, the candidate for the B.Sc. degree will be required to show that he has a reading knowledge of French, German, or Russian (or two of these, at option of the major department.)

Proficiency in English. See p. 40.

Standing. General regulations regarding standing are stated on p. 36. In addition, a candidate for the B.Sc. degree must be recommended for graduation by his major department.

A student clearly below the required minimum standard at the end of his penultimate year prior to graduation may be required to withdraw from his major field by his department.

Honours Requirements in Science. (See p. 73ff., and departmental announcements, p. 81ff.)

DIRECTOR OF THE SCHOOL: John Ruptash, B.SC., M.A.SC., PH.D.

A. Davidson Dunton, President of the University

C. J. Mackenzie, Chancellor of the University

John Ruptash, Director of the School

● *Bachelor of Engineering* (offered in the Day Division only)

The Bachelor of Engineering degree is awarded on successful completion of a four year program of studies as outlined on p. 66ff. In the first three years the emphasis is on mathematics, physics, chemistry and the engineering sciences. The following options or fields of study are offered in the fourth year of the B.Eng. curriculum: Civil Engineering, Electrical Engineering, Mechanical Engineering and Engineering Physics.

The four engineering programs of study offered at Carleton University have been accredited and meet the academic requirements for professional engineering registration by the Association of Professional Engineers of the Province of Ontario. The programs of study also meet the academic requirements for professional registration in the provinces of: Alberta, British Columbia, Manitoba, New Brunswick, Saskatchewan and Quebec.

Admission Requirements

(a) *First Year* — For admission to the first year of the program of studies leading to the Bachelor of Engineering degree, an applicant must have

passed the Qualifying year examinations at Carleton University (see p. 44) with a grade of 'C' or better in Mathematics, Chemistry and Physics; *or* the Ontario Senior Matriculation (Grade XIII) examinations or equivalent examinations of other recognized examining bodies in the following subjects, with an *average of at least 60 percent*:

1. English Composition
2. English Literature
3. Algebra
4. Geometry
5. Trigonometry
6. Physics
7. Chemistry
8. One of: A language other than English, History, Biology (Botany and Zoology).

In addition, the applicant must have passed the examinations in Algebra, Geometry, Trigonometry, Physics and Chemistry with an average of at least 65 percent.

An applicant must have credit in a language other than English at either the junior matriculation (Ontario Grade XII) or the senior matriculation (Ontario XIII) level.

(b) *Advanced Standing* — Applications for admission with advanced standing to the second or subsequent years of the program leading to the Bachelor of Engineering degree will be evaluated on an individual basis. Advanced standing for subjects completed at another university or college will be accepted only if the subject is recognized as the equivalent to a corresponding subject offered at Carleton University. Transfer of credit for the academic work of the first year of an Engineering program completed at another university or college will be considered provided the weighted grade point average is at least 1.6. Transfer of credit for the work of the second and third years will be considered provided the equivalent weighted grade point average is at least 1.8 and 2.0, respectively.

Course Requirements

Candidates for the Bachelor of Engineering degree are required to complete a prescribed program of studies covering four years after Senior Matriculation. The programs of study are outlined on pp. 66-69. The subjects comprising the programs of study are described under Details of Subjects, p. 102.

In addition, a candidate for the Bachelor of Engineering degree must have at least six months of suitable practical experience in technical work.

Evidence of appropriate summer employment or other technical exper-
ience must be submitted not later than the 31st of October on forms
obtainable from the Registrar's Office.

FIRST YEAR

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chemistry 105 (Qualitative Analysis and Elementary Physical Chemistry)........	3	3	3	3
English 115 (English)...................	2	2	–	–
Mathematics 100 (Calculus).............	4	4	–	–
Mathematics 137 (Geometry, Spherical Tri-gonometry and Algebra)...............	3	–	–	–
Physics 100 (Introductory Physics)........	3	3	3	3
Engineering 100 (Engineering Drawing)....	1	1	5	5
Engineering 105 (Surveying).............	–	2	–	–
Engineering 106 (Field Work in Surveying)*	–	–	–	–
Engineering 107 (Introduction to Machine Tools)................................	–	–	4/2	–
Engineering 110 (Mechanics I)...........	–	3	–	–
	16	18	13	11

*Two and one-half weeks at the end of the second term.

SECOND YEAR

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chemistry 215(Applied Physical Chemistry)	2	2	–	–
Geology 100 (General Geology)...........	2	2	2	2
Mathematics 200 (Calculus and Differential Equations).........................	3	3	–	–
Physics 201 (Introductory Electricity and Magnetism)........................	3	3	3	3
Engineering 203 (Field Trip)*...........	–	–	–	–
Engineering 211 (Mechanics II)...........	2	2	3/2	3/2
Engineering 220 (Mechanics of Materials I)	3	–	3	–
Engineering 240 (Thermodynamics).......	–	3	–	3
Engineering 265 (Introduction to Computer Programming)*......................	–	–	–	–
Elective (Humanity or Social Science).....	3	3	–	–
	18	18	$9\frac{1}{2}$	$9\frac{1}{2}$

*One week at the end of the second term.

THIRD YEAR

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Mathematics 303 (Mathematical Methods)	3	3	–	–
Engineering 312 (Mechanics of Machines I)	–	2	–	–
Engineering 321 (Mechanics of Materials II)	–	2	–	3
Engineering 330 (Fluid Mechanics)........	2	2	3/2	3/2
Engineering 341 (Introduction to Heat Transfer)...........................	2	–	3/2	–
Engineering 350 (Fundamentals of Electric Circuits and Machines)...............	3	3	3	3/2
Engineering 357 (Electronics I)...........	–	3	–	3
Engineering 366 (Computer Applications)..	3	–	3/2	–
Engineering 370 (Metallurgy I)...........	2	–	3/2	–
Elective (Atomic Physics, Humanity or Social Science)......................	3	3	–	–
	18	18	9	9

FOURTH YEAR (CIVIL ENGINEERING OPTION)

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay)........	–	–	–	–
Engineering 495 (Engineering Seminar)....	1	1	–	–
Engineering 497 (Engineering Project).....	–	–	4	6
Engineering 422 (Structural Analysis).....	3	3	–	–
Engineering 423 (Reinforced Concrete).....	–	3	–	3
Engineering 424 (Soil Mechanics)........	3	–	3/2	–
Engineering 425 (Structural Design).......	2	2	3	3
Engineering 431 (Hydrology)............	2	–	3/2	–
Elective (Basic Science or Engineering)....	2	2	3/2	3/2
Elective (Humanity or Social Science).....	3	3	–	–
	16	14	$11\frac{1}{2}$	$13\frac{1}{2}$

FOURTH YEAR (ELECTRICAL ENGINEERING OPTION)

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).........	–	–	–	–
Engineering 495 (Engineering Seminar)....	1	1	–	–
Engineering 497 (Engineering Project).....	–	–	4	6
Engineering 451 (Linear Network Theory)..	2	2	–	3
Engineering 453 (Electric Transmission and Radiation)...........................	–	3	–	–
Engineering 454 (Electromagnetic Fields)..	3	–	–	–
Engineering 455 (Feedback Control Systems)	3	–	3/2	–
Engineering 458 (Electronics II).........	2	3	3	3/2
Engineering 462 (Electrical Machines).....	2	–	–	--
Elective (Basic Science or Engineering)....	2	2	3/2	3/2
Elective (Humanity or Social Science).....	3	3	–	–
	18	14	10	12

FOURTH YEAR (MECHANICAL ENGINEERING OPTION)

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).........	–	–	–	–
Engineering 495 (Engineering Seminar)....	1	1	–	–
Engineering 497 (Engineering Project).....	–	–	4	6
Engineering 401 (Mechanical Analysis and Design)............................	2	2	3	3
Engineering 413 (Mechanics of Machines II)	2	–	3/2	–
Engineering 432 (Fluid Dynamics)........	3	–	–	–
Engineering 442 (Applied Thermodynamics)	3	3	3/2	3/2
Engineering 443 (Energy Conversion)......	–	3	–	3/2
Elective (Basic Science or Engineering)....	2	2	3/2	3/2
Elective (Humanity or Social Science).....	3	3	–	–
	16	14	$11\frac{1}{2}$	$13\frac{1}{2}$

FOURTH YEAR (ENGINEERING PHYSICS OPTION)

An outstanding student may be eligible for entrance to the fourth year option in Engineering Physics. The programs of study in the Engineering Physics Option consist of advanced courses in Mathematics, Physics, Chemistry and Engineering, selected to suit the special interest and aptitude of each student. The eligibility and selection of courses must be approved by the Engineering Physics Committee.

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).........	–	–	–	–
Engineering 495 (Engineering Seminar)....	1	1	–	–
Chemistry Elective......................	0–3	0–3	–	–
Mathematics Electives...................	3–6	3–6	–	–
Physics Electives.......................	3–6	3–6	0–3	0–3
Engineering Electives....................	6–9	6–9	3–6	3–6
Humanity or Social Science Elective.......	3	3	–	–
	19	19	6	6

Standing. The average standing of a student is determined by assigned grade point values to each letter grade, as follows: A = 4, B = 4, C = 2, D = 1, F = 0.

Promotion Requirements. The general regulations regarding failure, repetition and probation are outlined on p. 38.

In order to qualify for promotion from one year to the next, an engineering student must have passed either the final or the supplemental examination in every subject of his program, with a weighted grade point average of at least 1.4.

To qualify for supplemental examination privileges a student must attain a weighted grade point average of at least 1.0 in the final examinations.

If, after final and supplemental examinations, a student has failed to achieve standing in a subject which is a prerequisite for the course work of the following year, he may repeat the year's work or clear the deficiency as a part-time student. If the failed subject is not a prerequisite for the course work of the following year, the student may be conditionally promoted and may be permitted to repeat the failed subject as an extra subject, provided his weighted grade point average is at least 1.5.

If the academic standing of an engineering student does not meet the minimum promotion requirements, he may *either* clear his deficiency as

a part-time student *or* apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year. The academic load for a repeated year in engineering must be at least the equivalent of 15 hours of lectures and 9 hours of laboratory per week or 18 hours of lectures and 6 hours of laboratory per week. Subjects in which a grade of 'B' or better was obtained need not be repeated. The required subjects of the succeeding year may be included as part of a repeated year program provided a grade of 'B' or better was obtained in the prerequisite subjects.

Graduation Requirements

In order to fulfil the minimum graduation requirements for the degree of Bachelor of Engineering, a candidate must have passed all the course requirements of the first to fourth years, inclusive, with an overall weighted grade point average of at least 1.5 and, in addition, must be recommended for graduation by the School of Engineering.

Degrees with Distinction

Upon recommendation of the School of Engineering, the notation "with High Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Engineering. To receive this recommendation the candidate is expected to obtain a weighted grade point average of at least 3.4 in the course requirements of the final year and, in addition, a weighted grade point average of at least 3.0 in the course requirements of the first to fourth years, inclusive.

Upon recommendation of the School of Engineering, the notation "with Distinction" may be made on the academic records of a candidate who achieves a weighted grade point average of at least 3.0 in the final year and, in addition, at least 2.6 in the course requirements of the first to fourth years, inclusive.

● *Master of Engineering*

The School of Engineering offers graduate courses leading to the Master of Engineering degree in the fields of Aeronautical Engineering and Electrical Engineering. The courses offered are described under Details of Subjects, pp. 114-116. The graduate programs in engineering provide an opportunity for both full-time and part-time studies. Candidates who are employed on a full-time basis will normally require three academic years, or two academic years plus two summer terms, of part-time study to complete the requirements for a Master's degree. The study load of a candidate who is employed full-time is restricted to a maximum of six lecture-hours per week.

In addition to the general requirements for admission to the School of Graduate Studies, as specified on p. 76, a candidate for the Master of Engineering degree is required to have strong undergraduate preparation in Mathematics and Physics. Applicants who intend to specialize in the Aeronautical Sciences are expected to have credit, at the undergraduate level, for courses in Dynamics, Fluid Mechanics, Mechanics of Materials, Structural Analysis, Thermodynamics, Electronics and Elementary Applied Aerodynamics. Applicants who intend to specialize in the Electrical and Electronic Sciences are expected to have credit, at the undergraduate level, for courses in Feedback Control Systems, Electrical Machines, Electronics, Electromagnetic Field Theory, Electrical Transmission, Circuit Analysis, Electrical Transient Phenomena.

Courses offered by applicants, as undergraduate preparation for the Graduate Program, should be comparable, in level and content, to courses offered in the current School of Engineering undergraduate curriculum.

The graduate study program in engineering is an elective program. Candidates may select a number of courses which relate to their particular field of interest or activity. Individual programs must, however, form an integrated, balanced unit with emphasis on one, or at most two, aspects of the field of specialization. The program of studies must include at least two graduate courses in engineering, or the equivalent, at least one advanced course in mathematics or physics, and a thesis. Each candidate will be required to take an oral examination on his thesis, and a comprehensive examination on his field of specialization which may be written or oral. These examinations will be conducted by an Examining Board, appointed by the Director of the School of Engineering.

All candidates are required to demonstrate, to the satisfaction of the Examining Board, their ability to solve a reasonably complex problem, related to their field of specialization, using either an electronic analogue or a digital computer. The Board will accept credit in an appropriate course, or may, at its discretion, conduct an independent examination.

The thesis must represent the results of the candidate's independent research or development work, undertaken after admission to graduate standing at Carleton University. Experimental or theoretical results, previously published by the candidate, may be used only as introductory or background material for the thesis. A candidate may be permitted to carry on off-campus thesis research work providing the work is approved in advance and arrangements have been made for supervision of thesis-research activities by a faculty member of Carleton University. A part-time student may use the School of Engineering laboratory facilities for on-campus thesis research and development activities. In such cases a

period of not less than three calendar months of full-time University residence is required.

A candidate who has, before admission, completed independent research or development projects of an adequate level of accomplishment, may apply to the School of Graduate Studies for a waiver of the thesis requirement. Such applications must be made at the time of initial registration and must be supported by copies of published reports describing the work. If the application is approved, the candidate must take two additional graduate courses, one of which must be in Engineering, to fulfil the requirement for the award of a degree without a thesis.

Credit for one graduate course completed with a grade of 'A' or 'B' at another University may be offered in partial fulfillment of the requirements for award of the Master of Engineering degree, providing the course submitted for transfer credit is appropriate to the candidate's graduate program at Carleton University, and the credit for the course has been earned not more than three years prior to admission to graduate standing at Carleton. Application for transfer of credit must be made at the time of initial registration.

A limited number of students, who are not candidates for the Master of Engineering degree, may be admitted to each graduate Engineering course. Special students are expected to write the regular examinations in the course and must register during the normal registration period. Credit earned in a graduate course as a special student, may, with the approval of the Graduate Committee, be counted towards a Master's degree at a later date.

The Carleton University Computing Centre is equipped with an International Business Machines Company Type 1620 Data Processing System. Use of the Centre is granted to candidates registered in certain courses and for individual thesis research activities on the recommendation of the thesis supervisor and the Director of the School of Engineering.

General Regulations

The degrees of Bachelor of Arts with Honours and Bachelor of Science with Honours are designed for students who wish to deepen and extend their studies in their chosen discipline. They are essential also for those who contemplate further studies at the graduate level, or who desire to obtain a specialist certification for teaching in Ontario or other secondary schools. Courses leading to honours follow a detailed prescription of studies and require sustained high standards of achievement and penetration. The student in honours will be expected to show that he can work independently as well as in small groups, and he will have opportunities to read widely beyond as well as within the confines of his particular field of honours study.

The chairman of the department in which the candidate chooses his major subject or field of study will discuss and approve the course at each stage of progress.

Additional Admission Requirements

Admission to Honours will be granted only with the consent of the department in which the major subject is taken and with the approval of the Committee on Admission and Studies. Students who have attained 'B' or equivalent standing in the work of the First year and a grade of 'B' or better in the Honours subject, may be admitted to the Second year of an Honours course.

Students with at least a 75% average in Senior matriculation or a 'B' or equivalent standing in the Carleton Qualifying University year, and a grade of 'B' or better in the Honours subject, may be enrolled in Honours in the First year. Such students may take six courses as prescribed under the separate Divisions below.

Length of Course

Candidates for a degree with Honours will ordinarily take 25 courses in five years if admitted by Junior matriculation, or twenty courses in four years if admitted by Senior matriculation. With the permission of the department or departments concerned, it is possible for a candidate of exceptional ability to complete an Honours program in certain fields in three years from Senior matriculation by taking six courses in each winter session and one in each of the summers (if necessary, completing a graduation essay or thesis where required in the summer of the graduating year).

Course Selection

A candidate for Honours must choose a major subject or an approved combination of subjects, normally before entry to the Second year. Details

of Honours courses may be found below under the respective departmental programs. Students wishing to qualify for entry to the Ontario College of Education in the course leading to the High School Assistant's Certificate Type A should consult the Registrar and the appropriate departments regarding course selection.

Standing

General regulations regarding standing are stated on p. 36. Additional regulations regarding the standing of candidates for an Honours degree are as follows:

To receive credit towards an Honours degree, a candidate must maintain at least 'B' standing or the equivalent in the Honours and allied subjects. No student enrolled in an Honours course is permitted more than three supplemental examinations for any purpose during his Honours course.

A student who fails to maintain honours standing in any year must withdraw from Honours. Such a student may apply for admission to the Pass course.

At graduation, a student's honours standing is determined, on the basis of his entire record, and also upon the Department's recommendation, as First Class, High Second Class, or Second Class.

Programs of Study

(a) *Honours Programs in the Humanities*

At present Honours are available in Classics, English, French, German, and Philosophy. Certain programs of combined Honours may be arranged by permission of the departments concerned.

Students may enter Honours in the Humanities at the beginning of First year, or by transfer from the Pass course if 'B' or equivalent standing has been obtained. The First year Honours prescription consists of the present First year of the Pass Arts course, with the option of a sixth course to be chosen in consultation with the department concerned.

(b) *Honours Programs in the Social Sciences*

At present Honours are available in Economics, History, Political Science, Psychology, Public Administration, and Sociology. Combined honours programs are also available.

Students may enter Honours in the Social Sciences at the beginning of First year, or by transfer from the Pass course if 'B' or equivalent

standing has been obtained. The course pattern for entrance into First year Honours in the Social Sciences is as follows:

4 of: Economics 100
History 115
Political Science 100
Psychology 100
Sociology 100

1 of: English 100   ⎫ both to be taken
Philosophy 100   ⎭ before graduation

1 of: A First year language course   ⎫ two to be taken
A First year science course   ⎬ before graduation,
A First year mathematics course   ⎭ one of which
                                      must be a science

(c) *Honours Programs in the Natural and Physical Sciences*

At present Honours are available in Biology, Chemistry, Geology, Mathematics, Physics, Mathematics and Physics, and Applied Physics.

Students may enter Honours in Science from Senior Matriculation or by transfer from the Pass course if 'B' or equivalent standing has been obtained. The first year of the Honours science program consists of the present First year of Pass Science with the option of a sixth course to be chosen in consultation with the major department.

DIRECTOR OF THE SCHOOL:

M. S. MACPHAIL, M.A., D.PHIL., F.R.S.C.

Courses leading to graduate degrees are offered in the following: Biology, Canadian Studies, Chemistry, Economics, Engineering (aeronautical and electrical), English, French, Geology, History, Mathematics, Physics, Political Science, Public Administration, Psychology, Sociology.

Each candidate will be under the direction of a department, institute, or school, and must comply with any special conditions prescribed. Graduate students are under the general regulations of the University, and also those stated below. Candidates are advised that the number of places is limited, and even if their qualifications are satisfactory, it may not be possible to admit them. If the candidate's application is received by April 1, every effort will be made to inform him as to acceptance by May 1.

A candidate who wishes to graduate at the May convocation must submit his thesis (where applicable) by April 1.

Master of Arts, Master of Science, and Master of Engineering

Admission Requirements

Candidates must have a bachelor's degree with at least second class standing for admission. Those with pass degrees will normally require the equivalent of two years' full-time study, while those with honours degrees will normally require the equivalent of one year's full-time study. Candidates may be required to make up deficiencies in their background. A grade of B or better must be obtained in each course counted for credit towards the Master's degree.

Course Requirements

The normal requirement for the final year of the Master's degree will be five courses or the equivalent. Directed special studies may be counted as one course, while a substantial thesis based on the student's own research may be counted as two courses. Some courses may be selected from those open to undergraduates (200-499), but when such a course is taken for graduate credit the completion of additional assignments may be required. At least three courses (including the thesis) must be selected from those numbered 500-599.

Examinations

In addition to the usual examinations in individual courses, each candidate will be required to take either an oral examination on his thesis

or a comprehensive examination on his field. At the direction of his department, both examinations may be required, or they may be combined. Departments may also require examinations in languages other than English.

Time Limitation

A candidate who fails to complete the requirements for the degree within five years from the date of his admission into the final year must, if he wishes to continue, apply for extension of time.

Thesis

Students must provide four typewritten copies (original and three carbons), or acceptable duplicated copies, on a suitable grade of paper, 8½ by 11 inches. The thesis must be typed double-space, in a standard type-face, on one side of the paper, with at least 1½ inch margin at the left. Bibliographies, diagrams, and so forth, are to be prepared as directed by the department. A suitable abstract is to be provided. The original copy should be presented in an envelope, unbound in order of pagination, and the copies in spring binders, with the pages not mutilated in any way. The candidate gives the University the right to microfilm, photostat, and circulate the thesis and abstract, as may be required.

Doctor of Philosophy

Admission Requirements

Candidates will ordinarily have already taken the degree of M.A. or M.Sc.

Course and Thesis Requirements

The period of formal study and research required in the Ph.D. program will be at least two years of full-time study, or the equivalent, beyond the M.A. or M.Sc. qualification. The thesis will ordinarily carry a weight of about one half of the total requirement. The thesis must be a contribution to knowledge, and must demonstrate the candidate's capacity to undertake sustained research and to report the results in a fashion appropriate to the subject matter. The regulations stated above for the Master's thesis also apply.

Examinations

(a)   A qualifying examination may be set at the beginning of the course.

(b)   A comprehensive examination covering prescribed fields will be set, ordinarily one year before the thesis is to be presented. This

examination, which may be oral or written, or both, may include any work fundamental to a proper comprehension of the major subject.

(c)   After the thesis has been received and approved, a final oral examination on the subject of the thesis and related fields will be held.

(d)   Before the comprehensive examination (b), every candidate must satisfy the major department that he has a reading knowledge of two languages other than English, one of which must be French or German.

Time Limitation

A candidate who fails to complete the thesis within five years after the comprehensive examination must, if he wishes to continue, apply for extension of time.

Graduate Fees

Full-time—M.A.   Qualifying year: Same as undergraduates (see p. 33)
        M.Sc.   With honours standing, or after
        M.Eng.   qualifying year $350
                 For second year, if necessary   250
        Ph.D.   First year   350
        Ph.D.   Second year   350
        Ph.D.   Third year, if necessary   250
        Ph.D.   For residence thereafter, per year   100
        Ph.D.   For non-residence, to keep name on
                    books, per year   25

Part-time —   Per course: Same as undergraduate

Included in the above composite fee for full-time students are the following:

Students' Association $9.00
Athletics 1.00
Health Services 1.00
University Union Contribution 4.00

Committee of Management

1962-63

Chairman: A. D. Dunton, LL.D., D.SC., President of the University

Director: Robert L. McDougall, M.A., PH.D.

Members: James A. Gibson, (Dean of the Faculty of Arts and Science), Munro Beattie (English), Wilfrid Eggleston (Journalism), David M. L. Farr (History), James S. Tassie (French), Muni C. Frumhartz (Sociology), Pauline Jewett (Political Science), Stephan F. Kaliski (Economics), Gordon C. Merrill (Geography).

The Institute of Canadian Studies co-ordinates the resources of eight departments in the humanities and social sciences in the promotion of scholarship in the cultural history of Canada. Within this framework its character is determined by two assumptions: first, that the graduate student who has a special interest in Canadian studies can benefit from a broader approach to these studies than he is likely to make if he commits himself to the course and thesis requirements of a single department; second, that Canadian studies should be developed in a context that reflects the cosmopolitan origins of the country's traditions and an international rather than a strictly national outlook. In keeping with these assumptions the Institute offers the graduate student access to a program of interdisciplinary research and instruction in Canadian subjects, and at the same time sponsors studies in relations between Canada and the parent countries of Great Britain and France, between Canada and the United States, and between Canada and other members of the Commonwealth. The proximity of Carleton University to the National Library, the Library of Parliament, the Public Archives of Canada, the Dominion Bureau of Statistics, and the libraries of government departments and embassies ensures excellent facilities for research in the fields of study with which the Institute is concerned.

Degree of Master of Arts

General regulations governing admission to studies for the Master of Arts degree (p. 76) will apply. The diversified nature of the Institute's program, however, makes necessary two special regulations:

1. Students registering for graduate courses in disciplines in which they have had little or no undergraduate training may be required to undertake preliminary work in these fields.

2. A reading knowledge of French is a prerequisite for all graduate
courses given by the Institute.

The length of the M.A. program in the Institute of Canadian Studies
will normally be two years.

Courses

Three of the courses listed below, together with a thesis, oral and
written examinations on a comprehensive list of Canadian books, and such
preliminary courses as may be called for, complete the requirements for
the Master of Arts degree in the Institute of Canadian Studies.

Self-Government in Canada, 1867-1945 (CS 1) .... Department of History

Concepts of Empire, 1783-1931 (CS 6) .... Department of History

The Canadian Novel (CS 10) (half course in the first
term) .... Department of English

Le roman canadien de langue française (CS 20) (half
course in the second term of the same year as CS 10.
Concluding four seminars to be held jointly with
CS 10) .... Department of French

Canadian Poetry (CS 11) (half course in the first term
in alternate years with CS 10) .... Department of English

La poésie canadienne de langue française (CS 21) (half
course in the second term of the same year as CS 11.
Concluding four seminars to be held jointly with
CS 11) .... Department of French

The Press in Canadian Society (CS 30) .... Department of Journalism

The Political Process and its Application in Canada
(CS 46) .... Department of Political
                                                                                    Science

Canadian External Relations (CS 47) .... Department of Political
                                                                                    Science

Canadian Social Structure and Institutions (CS 60)) .... Department of Sociology

*Comparative Studies in the Literary Cultures of Canada
and the United States* (CS 110) .... Department of English

*Comparative Studies in the Literary Cultures of Canada
and Australia* (CS 111) .... Department of English

*Forms for admission to graduate studies may be obtained from the
Registrar, Carleton University.*

*Applications for admission to the M.A. program of the Institute of
Canadian Studies should be sent to the Director of the Institute. The
closing date for applications for University Fellowships (see page 197) is
March 1.*

DETAILS OF SUBJECTS

The course numbering pattern is, in general, as follows:

10-99   Courses usually taken in the Qualifying University year.

100-199   Courses usually taken in the First year.

200-299   Courses usually taken in the Second year.

300-399   Courses usually taken in the Third year.

400-499   Courses ordinarily taken by students in the Fourth year, that is, final year of Engineering or Honours Arts and Science.

N.B.   Half courses are marked with an asterisk.

A listing of discontinued courses is available upon request to the Office of the Registrar, Carleton University.

ACCOUNTING

Assistant Professor	W. R. Scott, B.Com., C.A.
Sessional Lecturers	A. A. Sterns, Lic.com., Dr. rer. pol.
	C. N. Brennan, B.Com., M.S., C.A.
	Albert B. Larose, B.Com., C.A.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting degrees—Chartered Accountant (C.A.), Certified Public Accountant (C.P.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.)—should consult the Professor of Accounting before entering the final year of the Commerce course.

Other enquiries about Accounting courses should also be directed to the Professor of Accounting.

ACCOUNTING 100. [210]. *Elementary Accounting*

The theory and practice of accounts, including the purposes of the double entry analysis of transactions; the establishment of financial classifications through the medium of books of original entry and the ledgers; the preparation of periodic financial statements and a study of the accounting entries required for that purpose; an introduction to the concepts of costs and of revenues and to the problems of effecting a periodic matching in the accounts; partnership and corporation accounting.

> *Day Division*: Annually (lectures two hours a week; weekly problem periods).
>
> *Evening Division:* Annually (lectures two hours a week; occasional problem periods).

Professor Scott and Mr. Larose

ACCOUNTING 200. [310]. *Intermediate Accounting*

The theory and practice of accounts with particular attention to the corporate form of business organization; accounting application of legal and policy considerations regarding capital stock, retained earnings and appropriations thereof, bonds and other liabilities; problems in the valuation of inventories, investments, plant and equipment and other assets; present status of accounting standards and terminology, with particular reference to the preparation of financial statements; techniques employed in the analysis and interpretation of accounting data.

PREREQUISITE: Accounting 100.

> *Day Division*: Annually (lectures two hours a week, weekly problem periods).
>
> *Evening Division*: Annually (lectures 2 hours a week, occasional problem periods).

Professor Scott and Mr. Brennan

ACCOUNTING 300. [320]. *Advanced Accounting*

A further study in the development of the accounting theory underlying corporate financial statements, the limitations of the financial statements and the need for other classifications of accounting data particularly in managerial control; the role of the internal and external auditor as a function of control. An introduction to the problems involved in the financing of a business enterprise.

PREREQUISITE: Accounting 200.

> *Day Division*: *Not offered*, 1962-63.
>
> *Evening Division*: 1962-63 (lectures and case discussions two hours a week).

Professor Scott

ACCOUNTING 325. [345]. *Cost Accounting*

The field of cost accounting, including a study of the elements of costs; analysis of types of costs; distribution of cost elements to units of production in job cost systems and process cost systems; cursory treatment of estimated and standard cost systems.

PREREQUISITE: Accounting 200.

> *Evening Division*: Annually (lectures two hours a week, occasional problem periods).

Dr. Sterns

Accounting 340. [380]. *Government Accounting and Finance*

A study of the financial administration and organization of the Canadian Government, including the preparation, legalization, and execution of the budget; the authorization and collection of revenues; government borrowing and public debt; parliamentary appropriations; the disbursement of public monies; the audit of the public accounts; the financial functions of Parliament; the Committees of Supply and Ways and Means; the Governor in Council; the Treasury Board; the Receiver General and Minister of Finance; the Department of Finance and the Comptroller of the Treasury; the Bank of Canada; the Auditor General; and the Public Accounts Committee. The course will include some references to the financial administrative practices of other countries.
Prerequisite: Accounting 100.
Not offered 1962-63.

BIOLOGY

Professor; Chairman of the Department, 1962-63
H. H. J. Nesbitt, M.A., Ph.D., D.Sc., F.L.S., F.R.E.S., F.Z.S.
Associate Professors . . . . George Setterfield, B.A., Ph.D.
Frank Wightman, B.Sc., Ph.D.
W. I. Illman, B.A., M.Sc., Ph.D.
Assistant Professor . . . . Donald A. Smith, M.A., Ph.D.
Assistant Professor, and Curator of the Herbarium . Isabel L. Bayly, B.Sc., M.A.
Sessional Lecturers . . . . Jean P. Fletcher, M.A., Ph.D.
V. E. F. Solman, M.A., Ph.D.
J. S. Tener, M.A., Ph.D.
Demonstrators . . . . Barbara Gordon, B.A.
Elizabeth M. Arnason, M.S., Ph.D.
C. W. Leggatt, B.S.A., M.Sc., Ph.D., F.A.I.C.
Post-Doctoral Fellow . . . . Yoshio Masuda, D.Sc.
Teaching Fellows . . . . Hugh J. Hope, B.Sc.
Elnora Schneider, B.Sc., M.S., Adelina Valezuela, M.Sc.

The presence in Ottawa of many of Canada's leading research laboratories, the national botanical and zoological collections, and large libraries, and the frequent visits to Ottawa by eminent scientists from other centres, make Carleton an ideal place for the study of the life sciences.

UNDERGRADUATE PROGRAMS

Students reading for Honours or Pass degrees in Biology must arrange their courses, *in consultation with the Chairman of the Department,* in one of the patterns outlined below. They must, in addition, have a reading knowledge of French, German or Russian, attend a seven-day field course arranged by the Department at the beginning of either Year III or IV, and pass a comprehensive examination at the conclusion of their period of study.

PASS DEGREE PROGRAMS

1. *Pass B.Sc. in Biology*
Students reading for a Pass Bachelor of Science degree in Biology must satisfy the general requirements for Science stated on pp. 61-63, and arrange their courses in the following pattern.
Year I: Biology 100; Chemistry 100; *either* Physics 100 *or* Geology 100; Mathematics 100 (or 130 with the permission of the Chairman of the Department of Biology); and *either* English 100 *or* Philosophy 100.
Year II: Biology 215; *either* Botany 310 *or* 330/332; *either* Zoology 305 *or* 315; a second course in the minor field (a science or Mathematics); *either* English 100 *or* Philosophy 100 (whichever was not taken in Year I).

Year III: Biology 340 and 360; *one* of the alternative Botany or Zoology courses not taken in Year II; a third course in the minor field; and an optional non-mathematics, non-science course.

2. *Pass B.A. in Biology*

Students who plan to read for a Pass Bachelor of Arts degree in Biology must obtain permission from the Chairman of the Department, satisfy the general requirements for Arts stated on pp. 42-45, and arrange their courses in the following pattern:

Year   I: Biology 100; Chemistry 105; and *three* courses chosen from three of Groups 1 to 4 of the Arts I requirement on p. 44.

Year   II: Biology 215; *either* Botany 310 *or* 330/332; *either* Zoology 305 *or* 315; one course to complete the Arts I requirements; and one additional course.

Year III: Biology 340 and 360; one of the alternative Botany or Zoology courses not taken in Year II; and two additional courses.

3. *Pass B.A. in Biology (Pre-medical)*

Prospective pre-medical students are advised that many medical schools prefer that candidates who read for a Bachelor's degree prior to entry into Medicine obtain a sound grounding in basic science and arts subjects rather than anticipate medical school courses. To this end, a special program leading to the Pass Bachelor of Arts degree in Biology (Pre-medical) has been designed. This includes Biology 100, 215, 340 and Zoology 305 and 315; Chemistry 105 and 220; Physics 100; Mathematics 100; English 100; Philosophy 100; a social science; a language course numbered in the 100's; and two optional courses, which might include Sociology, Psychology, or Statistics. *Interested students should consult the Chairman of the Department to arrange their pre-medical program to meet the individual requirements of the medical school to which they hope to gain admission.*

HONOURS DEGREE PROGRAM

Students planning a career in biological research are advised to enter the Honours program as soon as possible. Students reading for an Honours Bachelor of Science degree in Biology must satisfy the general requirements for Honours stated on pp. 73-75, and arrange their course programs as follows:

Years I, II, III: Courses are to be arranged in the pattern described above for the Pass B.Sc. in Biology, but this basic program will be enriched by directed readings and other studies assigned by the Department. With the permission of the Chairman, one or two courses of Year III may be postponed to Year IV in order that the fourth 300-series Botany or Zoology course or an available Honours course may be taken in Year III.

Year IV: Biology 475 and four additional courses.

Students wishing to obtain the Ontario College of Education Interim High School Assistant's Certificate, Type A, are advised to consult the Chairman of the Department as soon as possible in their university career in order that an appropriate Honours program may be arranged. (See also p. 25).

BIOLOGY 20. [200]. *Concepts and Methods in the Biological Sciences*

A course designed to illustrate the fundamental principles governing organic processes (animal and plant), the development and relationship of organisms, and the position of man in the organic world. This course is primarily intended for persons who do not intend to take further courses in Biology.

TEXT: Villee, *Biology* (Saunders).

> *Day Division*: Annually (lectures three hours a week, laboratory three hours a week).

Members of the Department

BIOLOGY 100. [210]. *General Biology*

An introductory lecture and laboratory course on the fundamental principles of biology.

TEXT: Taylor and Weber, *General Biology*.

> *Day Division*: Annually (lectures three hours a week, laboratory four hours a week).

Members of the Department

BIOLOGY 215. [310]. *Genetics*

A lecture and laboratory course on the mechanisms of inheritance and gene function.
TEXT: To be announced.

PREREQUISITE: Biology 100.

> *Day Division*: Annually (lectures two hours a week, laboratory four hours a week).

Professor Setterfield

BIOLOGY 340. *Plant and Animal Physiology*

A lecture and laboratory course on the fundamental principles of plant and animal physiology.

TEXTS: Langley, *Cell Function* (Reinhold).
Bonner and Galston, *Principles of Plant Physiology* (Freeman).
Meyer, Anderson and Bohning, *Introduction to Plant Physiology* (Van Nostrand).
Prosser and Brown, *Comparative Animal Physiology* (Saunders).
Yapp, *An Introduction to Animal Physiology* (Oxford).

PREREQUISITES: Biology 100 and Chemistry 100 or 105.

> *Day Division*: Annually (lectures three hours a week, laboratory four hours a week).

Professors Wightman and Smith

BIOLOGY 360. *Ecology*

A lecture and seminar course on the principles of plant and animal ecology.
PREREQUISITE: Biology 100.

> *Day Division*: Annually (lectures and seminars three hours a week).

Dr. Solman and Professor Bayly

BOTANY 310. *Comparative Anatomy and Morphology of the Vascular Plants*
A course on the detailed developmental anatomy and evolution of higher plants including bryophytes.
TEXTS: Foster and Gifford, *Comparative Morphology of the Vascular Plants* (Freeman).
Esau, *Anatomy of Seed Plants* (Wiley).
PREREQUISITE: Biology 100.
Day Division: Annually (lectures two hours a week, laboratory four hours a week).
Professor Bayly

BOTANY 330*. *Cryptogamic Botany (Algae)*
A half course on the morphology, reproduction, and evolution of the algae.
PREREQUISITE: Biology 100.
TEXTS: Smith, *Cryptogamic Botany*, Vol. I (McGraw-Hill).
Smith, *Manual of Phycology* (Ronald).
Day Division: 1962-63 (lectures two hours a week, laboratory four hours a week, *first* term).
Professor Illman

BOTANY 332*. *Cryptogamic Botany (Fungi)*
A half course on the morphology, reproduction, and evolution of the fungi.
TEXTS: Smith, *Cryptogamic Botany*, Vol. I (McGraw-Hill).
Alexopoulis, *Introductory Mycology* (Wiley).
PREREQUISITE: Biology 100.
Day Division: 1962-63 (lectures two hours a week, laboratory four hours a week, *second* term).
Professor Illman

BOTANY 350*. *Plant Physiology* (half course). *See Biology* 340.

ZOOLOGY 305. *Invertebrate Zoology*
A lecture and laboratory course on the comparative anatomy, development, classification and evolution of the invertebrate animals. As part of the practical work, each student must submit a properly labelled collection of at least fifty invertebrate animals.
TEXT: Borradaile, Eastham, Potts and Saunders, *The Invertebrata* (Cambridge).
REFERENCE TEXTS: Brown, *Selected Invertebrate Types* (Wiley).
Parker & Haswell, *Text-book of Zoology*, Vol. I (Macmillan).
Bullough, *Practical Invertebrate Anatomy* (Macmillan).
PREREQUISITE: Biology 100.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
Professor Nesbitt

ZOOLOGY 315. *Chordate Zoology*
A lecture and laboratory course on the comparative anatomy, development, classification and evolution of the chordates. As part of his practical work, each student must make a small collection of chordates, and become familiar with certain common local vertebrates. Detailed directions may be had on application to the Department.
TEXTS: Colbert, *Evolution of the Vertebrates* (Science Editions).
Romer, *The Vertebrate Body* (Saunders).
PREREQUISITE: Biology 100.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
Evening Division: 1962-63 (lectures three hours a week, laboratory four hours a week).
Professor Smith

ZOOLOGY 350. *Animal Physiology* (half course). *See Biology* 340.

BIOLOGY 420. *Cytology*

A study of the structure, composition and function of cells at the microscopic and macro-molecular levels.

TEXT: De Robertis, Nowinski and Saez, *General Cytology*, 3rd ed. (Saunders).

PREREQUISITES: Biology 215 and Chemistry 220.

Day Division: 1963-64 and alternate years.

Professor Setterfield

BIOLOGY 430. *General Microbiology*

The general principles and practice of microbiology. Consideration will be given to the biologic, economic, ecologic, and industrial importance and to the metabolic processes and the taxonomy of autotrophic, saprobic, and parasitic bacteria, yeasts, moulds and actinomycetes.

PREREQUISITES: Biology 100 and 340, and Chemistry 220.

Day Division: *Not offered*, 1962-63.

BIOLOGY 450. *Cellular Physiology and Biochemistry*

A lecture and laboratory course on the comparative physiology and biochemistry of plant and animal cells.

TEXTS: Giese, *Cell Physiology* (Saunders)
Fruton and Simmonds, *General Biochemistry* (Wiley)

PREREQUISITES: Biology 100 and 340, and Chemistry 220.

Professor Wightman

BIOLOGY 475. *History of Biology*

A seminar course on the history of biology and biological theory.

REFERENCE TEXTS: Nordenskiöld, *The History of Biology* (Knopf).
Huxley, *Evolution, the Modern Synthesis* (Harpers).
Ross, *A Synthesis of Evolutionary Theory* (Prentice-Hall).
Woodger, *Biological Principles* (Keegan-Paul).
Bertalanffy and Woodger, *Modern Theories of Development* (Oxford).
Darwin, *Origin of Species* (Everyman's)
Sullivan, *The Limitations of Science* (New American Library).

PREREQUISITES: Biology 215 and 340.

Day Division: 1962-63 (one two-hour seminar a week).

Professor Nesbitt

BIOLOGY 490. *Research Project and Seminar*

Students reading for an Honours degree in Biology may do a research project under the direction of one of the members of the Department. Seminars will be held at which Honour students will present reports on recent progress in selected fields of biology. The attendance at such seminars and at other similar meetings at research institutions in Ottawa will bring the student into close contact with specific problems in current fields of biological research.

Day Division: Annually (laboratory hours and seminar periods to be arranged).

Members of the Department

BOTANY 420. *Taxonomy of the Flowering Plants*

A general survey of the flowering plants, the bases for classification, and the history of taxonomy.   A project will be assigned.

TEXT: Lawrence, *Taxonomy of Vascular Plants* (Macmillan).

PREREQUISITE: Botany 310.

> *Day Division*: 1962-63   (lectures two hours a week, laboratory four hours a week).

Professor Bayly

BOTANY 424*. *Field Taxonomy*

Though this course will be primarily concerned with field taxonomy and related laboratory work, there will be seminars and lectures on selected groups. Ecological associations will be considered and collections will be made. (Half course).

PREREQUISITE: Botany 420.

> *Not offered*, 1962-63.

BOTANY 428*. *Project in Taxonomy*

A seminar and reading course, including the preparation of a paper on an assigned project. (Half course).

PREREQUISITE: Botany 420.   (Botany 424 should be taken concurrently).

> *Not offered*, 1962-63.

ZOOLOGY 455. *Histology and Embryology*

A lecture and laboratory course on the fundamental principles of the histology and embryology of vertebrates.

PREREQUISITE: Zoology 315.

> *Not offered*, 1962-63.

ZOOLOGY 460. *Entomology*

A course on the morphology and physiology of representatives of the more important orders and families of insects.

REFERENCE TEXTS: Snodgrass, *Principles of Insect Morphology* (McGraw-Hill).
                  Wigglesworth, *Insect Physiology* (Methuen).

PREREQUISITE: Zoology 305.

> *Not offered*, 1962-63.

ZOOLOGY 480. *Taxonomy of the Vertebrates*

A lecture, seminar and laboratory course on the classification, evolution and geographic distribution of the major groups of vertebrates.

PREREQUISITE: Zoology 315.

> *Day Division*: 1962-63   (to be arranged).

Professor Smith

ZOOLOGY 485. *Principles of Systematic Zoology*

A course devoted to an intensive study of the principles and methods of animal classification.

PREREQUISITE: Permission of the Department.

> *Not offered*, 1962-63.

GRADUATE STUDIES

The Department of Biology will welcome graduate students of the necessary competence in the following fields of study: Cytology, Ecology, Entomology including Acarology, Mammalogy, Mycology and Plant Pathology, Plant Physiology, Plant Systematics, Plant Anatomy, and Wildlife Biology.

BIOLOGY 500. *Advanced Genetics*
A seminar and problem course in the principles and practice of modern genetic theory.
PREREQUISITES: Biology 215 and a course in statistics.
Professor Illman

BIOLOGY 520. *Advanced Cytology*
An analysis of recent developments in the study of cell structure and function.
PREREQUISITE: Biology 420.
Professor Setterfield

BOTANY 500. *Mycology*
An advanced course devoted to the morphology, reproduction, taxonomy, and evolution of the fungi.
PREREQUISITE: Botany 332.
Professor Illman

BOTANY 510. *Plant Physiology*
An advanced course in plant physiology.
PREREQUISITE: Biology 450.
Professor Wightman

BOTANY 520. *Plant Biochemistry*
An advanced course in plant biochemistry.
PREREQUISITE: Biology 450.
Professor Wightman

BOTANY 560. *Plant Ecology*
PREREQUISITE: Permission of the Department.
Professor Bayly

ZOOLOGY 510. *Acarology*
An advanced course devoted to the Acari (mites).
PREREQUISITE: Zoology 460.
Professor Nesbitt

ZOOLOGY 520. *Advanced Entomology I*
A course devoted to an advanced study of insect morphology and phylogeny.
PREREQUISITE: Zoology 460.
Professor Nesbitt

ZOOLOGY 525. *Advanced Entomology II*
A course devoted to an advanced study of insect taxonomy.
PREREQUISITE: Zoology 460.
Professor Nesbitt

ZOOLOGY 530. *Advanced Entomology III*
A course devoted to an advanced study of insect physiology.
PREREQUISITES: Biology 340 and Zoology 460.

ZOOLOGY 540. *Mammalogy*
A seminar and laboratory course on the taxonomy, distribution, and ecology of mammals.
PREREQUISITES: Zoology 480 and Biology 360.
Professor Smith

ZOOLOGY 560. *Animal Ecology*
PREREQUISITE: Permission of the Department.
Dr. Tener

CHEMISTRY

Professor; Chairman of the Department, 1962-63   J. M. Holmes, B.Sc., M.A., Ph.D.
Professor   .   .   .   .   .   J. M. Morton, M.Sc., M.A., Ph.D., F.C.I.C.
Associate Professor   .   .   .   .   .   P. M. Laughton, B.A., M.Sc., Ph.D.
                                                      (on leave of absence, 1962-63)
Assistant Professors   .   .   .   J. W. ApSimon, B.Sc., Ph.D., E. A. Cherniak,
                                                      M.A., Ph.D., A. G. Forman, B.A., M.Sc.,
                                                      D. R. Wiles, B.Sc., B.Ed., M.Sc., Ph.D.
Special Lecturer   .   .   .   .   .   .   Natasha C. Hollbach, B.Sc., Ph.D.
Senior Demonstrators .   .   .   .   Irene Brownstein, M.S.
                                                      R. T. Elworthy, M.B.E., B.Sc., Ph.D.
                                                      Virginia Prince, B.A.

PASS COURSE

A pass course student majoring in Chemistry should have completed Chemistry 10 [110] and 100 [210] before entry to the Second year. It is recommended that Physics 100 [205] and Mathematics 100 [211] be taken in First year and Physics 201 [305] and Mathematics 200 [310] in Second year. At least four Chemistry courses beyond Chemistry 100 [210] are required, including Chemistry 210 [310] and 220 [320] in the Second year and 330 in the Third year.

HONOURS COURSES

An Honours degree is the normal requirement for admission to graduate work or professional standing in Chemistry.

General regulations concerning admission, standards, and length of course are found on pp. 73-75 of the calendar. Normally students enter the Honours program in Chemistry in their Second year. In exceptional circumstances, a candidate may enter Honours directly from high school in the First year and proceed in the manner outlined in the general regulations.

In consultation with the Department, options may be chosen which will satisfy the requirements for admission to the Ontario College of Education for the High School Assistants' Certificate, Type A, either in Science or in Physics and Chemistry.

The Qualifying University and First years are those of the pass science course, including Chemistry 100 [210], Mathematics 100 [211], and Physics 100 [205]. At least 16 courses are required beyond the First year, including the following:

1.   At least eight courses in Chemistry, including Chemistry 210 [310], 220 [320], 310 [350], 320 [340], 330, 350 [360], 490, and one of 410, 420, 440, and 450 [460].
2.   Mathematics 200 [310].
3.   Physics 201 [305] and 202 [304].
4.   Further supporting science and Mathematics courses.
5.   Two additional non-science, non-Mathematics courses, normally including one in a language other than English.

Seminar

Seminars will be presented weekly on research topics by research scientists, graduate students, and final year honours students. Chemistry honours students in every year are required to attend all departmental seminars.

Language Requirement

Each candidate for honours is required to demonstrate a reading knowledge of two of scientific French, German, and Russian.

Thesis

Each candidate for honours in Chemistry is required as part of Chemistry 490 in the final year to carry out a research project and to write a thesis. Four type-

written copies of this thesis are to be deposited with the Chemistry Department not later than April 15th. One copy of the thesis may be returned to the candidate.

GRADUATE STUDIES

Graduate studies at M.Sc. and Ph.D. levels are offered in the department in the fields of organic chemistry, physical chemistry, and inorganic and nuclear-chemistry. Normally, graduate work in Chemistry must be conducted full time in residence and research must be done in the department's laboratories under supervision of the staff.

In addition to the general requirements, candidates for the M.Sc. in Chemistry are required to pass a comprehensive examination, and to demonstrate a reading knowledge of two of scientific French, German, and Russian.

CHEMISTRY 10. [110]. *Introductory Chemistry*

An introductory course emphasizing the fundamental laws and principles of chemistry. The more important metals and non-metals and their compounds are studied.

TEXTS: Ritter, *An Introduction to Chemistry* (J. Wiley, 1955).
Malm and Frantz, *College Chemistry in the Laboratory* 2 (W. H. Freeman and Co., 1954).
Pierce and Smith, *General Chemistry Workbook* (W. H. Freeman and Co., 1958).
Day Division: 1962-63 (lectures three hours a week, laboratory three hours a week).
Evening Division: *Not offered*, 1962-63.

Professor Forman

CHEMISTRY 100. [210]. *General Chemistry*

Gases, liquids, solids, and solutions, chemistry of selected groups of elements and their compounds, including both inorganic and organic compounds; and a qualitative survey of the most important theories used to explain this behaviour: energy relationships, electron structure and the periodic table, quantization of energy, theories of chemical bonding and of chemical reaction.
The laboratory will involve qualitative and elementary quantitative analysis, elementary physical chemistry, and the preparation of certain organic and inorganic compounds.

TEXTS: Hiller and Herber, *Principles of Chemistry* [McGraw-Hill, 1960].
Sorum, *Introduction to Semimicro Qualitative Analysis* [Prentice-Hall, 1960].
Schaum, *Theory and Problems of College Chemistry* [Schaum, 1958].
PREREQUISITES: Chemistry 10 [110] and Mathematics 30 [116] or 15* [110] and 35* [112], or equivalents, and matriculation for the Bachelor of Science degree.
Day Division: 1962-63 (lectures three hours per week, laboratory three hours per week).
Evening Division: *Not offered*, 1962-63.

Professor Wiles

CHEMISTRY 105. *General Chemistry*

Lecture and laboratory outline the same as Chemistry 100 [210] above.

TEXTS: Sienko and Plane, *Chemistry* [McGraw-Hill, 1961].
Sorum, *Introduction to Semimicro Qualitative Analysis* [Prentice-Hall, 1960].
Schaum, *Theory and Problems of College Chemistry* [Schaum, 1958].
PREREQUISITES: Chemistry 10 [110] and Mathematics 30 [116] or 15* [110] and 35* [112] and enrolment in a program other than for the degree of Bachelor of Science.
Day Division: 1962-63 (lectures three hours per week, laboratories three hours per week).
Evening Division: *Not offered*, 1962-63.

Professor Morton

CHEMISTRY 210. [310]. *Physical Chemistry*

Structure of atoms and molecules, kinetic theory of gases, properties of liquids and solids, thermodynamics and thermochemistry, free energy and homogeneous and heterogeneous chemical equilibria, properties of solutions of electrolytes and non-electrolytes, phase equilibria, electrolytic conduction, electrochemical cells, surface chemistry and colloids.

TEXTS: Barrow, *Physical Chemistry* (McGraw-Hill, 1961).

Daniels, Matthews and Williams, *Experimental Physical Chemistry* (McGraw-Hill, 5th edition, 1956).

PREREQUISITES: Chemistry 100 [210] and Mathematics 100 [211].

Day and Evening Divisions: 1962-63 (lectures three hours per week, problems one hour per week, laboratory three hours per week).

Professor Holmes and Dr. Hollbach

CHEMISTRY 215*. [315]. *Applied Physical Chemistry*

Atomic and molecular structure, kinetic theory, structure and properties of crystals, glasses, polymers, dielectrics and semiconductors, thermodynamics, chemical and phase equilibria, chemical kinetics and statistics, properties of electrolytes, electrochemical and fuel cells, corrosion, nuclear processes, chemical effects of ionizing radiation.

TEXT: Sheehan, *Physical Chemistry* (Allyn and Bacon, Inc., 1961).

PREREQUISITES: Chemistry 105 [210] and Mathematics 100 [211].

Day Division: (lectures two hours per week with weekly problem assignments).

Professor Cherniak

CHEMISTRY 220. [320]. *Organic Chemistry*

An introductory course in organic chemistry, consisting of a survey of the chemistry of aliphatic and simple aromatic compounds. Emphasis is placed on the more general theoretical principles concerning structure and reactivity. The laboratory work provides practice in preparations, reactions, and detection of the more common functional groups.

TEXTS: Noller, *Chemistry of Organic Compounds* (W. B. Saunders Co. 1957).

Fieser and Fieser, *Organic Chemistry* (D. C. Heath, 1956).

Coleman, Wauzonek and Buckles, *Laboratory Manual of Organic Chemistry* (Prentice-Hall, 1962).

PREREQUISITE: Chemistry 100 [210].

Day Division: 1962-63 (lectures three hours a week, laboratory four hours a week).

Evening Division: *Next offered*, 1963-64.

Professor ApSimon

CHEMISTRY 310. [350]. *Physical Chemistry*

Quantum chemistry, theories of chemical bonding, molecular structure determination, chemical thermodynamics and statistics, a survey of the kinetics and mechanisms of various types of chemical reactions.

REFERENCE TEXTS: Pitzer, *Quantum Chemistry* (Prentice-Hall, 1953).

Lewis and Randall, *Thermodynamics* (McGraw-Hill, 2nd edition, 1961).

Frost and Pearson, *Kinetics and Mechanism* (J. Wiley, 2nd edition, 1961).

Wheatley, *The Determination of Molecular Structure* (Oxford, 1959).

PREREQUISITE: Chemistry 210 [310].

Day Division: Annually (lectures three hours a week, problems one hour a week, laboratory three hours a week).

Professor Cherniak

CHEMISTRY 320. [340]. *Organic Chemistry*

The lecture work consists of a survey of alicyclic, polynuclear aromatic and heterocyclic chemistry, with emphasis on methods of structure proof and synthesis, and the application of the electronic theory to problems of structure and reactivity. The laboratory work on preparative techniques, and qualitative identification of organic compounds singly and in mixtures, is accompanied by paper problems of the same kind.

TEXTS: Fieser and Fieser, *Organic Chemistry* (D. C. Heath, 3rd Ed. 1956).
Shriner, Fuson and Curtin, *Systematic Identification of Organic Compounds* (Wiley, 1956).

PREREQUISITE: Chemistry 220 [320].

Day Division: Lectures three hours per week, laboratory four hours per week.

Professor Forman

CHEMISTRY 330. *Quantitative Analysis*

A course in quantitative analysis, covering the fundamental methods of volumetric and gravimetric analysis and selected instrumental methods.

TEXTS: Hamilton and Simpson, *Talbot's Quantitative Analysis* (Macmillan, 11th Edition, 1958).

PREREQUISITES: Chemistry 100 [210], 210 [310].

Day Division: 1962-63 (lectures two hours a week, laboratory six hours a week).

Evening Division: *Not offered*, 1962-63.

Professor Morton

CHEMISTRY 350. [360]. *Inorganic Chemistry*

The structure of the nucleus and the atom; elementary quantum mechanical theory of atomic and molecular structure; co-ordination chemistry; solid state chemistry, and other topics.

TEXTS: Heslop and Robinson, *Inorganic Chemistry* (Elsevier, 1960).
Jolly, *Synthetic Inorganic Chemistry* (Prentice-Hall, 1960).

PREREQUISITES: Chemistry 210 [310] and 330. (Chemistry 330 may be taken concurrently).

Day Division: 1962-63 (lectures three hours a week, laboratory four hours a week).

Professor Wiles

CHEMISTRY 410. *Physical Chemistry*

[a] Surface chemistry, particularly of the gas-solid interface.
[b] Kinetics, mechanisms and theories of gas phase reactions.

PREREQUISITE: Chemistry 310 [350].

Day Division: Lectures and seminars three hours a week, laboratory three hours a week.

Professors Holmes and Cherniak

CHEMISTRY 420. *Organic Chemistry*

Selected topics such as electronic theories of structure, the mechanisms of organic reactions, stereochemistry, and the chemistry of more complex naturally occurring substances. Students will be required to demonstrate a capacity for interpreting and criticizing the original literature.

PREREQUISITE: Chemistry 320 [340], and permission of the instructor.

Day Division: 1962-63 (lectures three hours a week, laboratory three hours a week).

Professors ApSimon and Forman

CHEMISTRY 440. *Biochemistry*

A survey course in plant and animal biological chemistry arranged in conjunction with the Biology Department and available only to advanced students.

PREREQUISITE: Permission of the Department.

Day Division: *Not offered* 1962-63.

CHEMISTRY 450. [460]. *Nuclear Chemistry*

The structure of nuclei; radioactive; disintegration; detection and measurement of radiation; chemical studies of nuclear reactions; radioactive tracer studies of chemical phenomena.

PREREQUISITE: Chemistry 350 [360] and permission of the instructor.

Day Division: 1962-63 (lectures and seminars three hours per week, laboratory three hours per week).

Professor Wiles

CHEMISTRY 490. *Research Project and Seminar*

Senior students in Honours Chemistry will carry out a research project under the direction of one of the members of the Department.

Day Division: Annually.

Members of the Department

CHEMISTRY 510. *Contemporary Topics in Physical Chemistry*

Professors Holmes and Cherniak

CHEMISTRY 520. *Contemporary Topics in Organic Chemistry*

Professors ApSimon and Forman

CHEMISTRY 550. [560]. *Contemporary Topics in Inorganic and Nuclear Chemistry*

Professor Wiles

CHEMISTRY 590. *Graduate Research*

Members of the Department

CLASSICS

Associate Professor;
Chairman of the Department, 1962-63 . F. Ellenor M. Swallow, M.A., Ph.D.
Assistant Professor . . . . A. Trevor Hodge, M.A., Ph.D.
Lecturer . . . . Terence R. Robinson, M.A.
Sessional Lecturers . . . . N. M. Goble, M.A.
W. H. Showman, M.A.

Qualified students may read for Honours in Classics, or students may elect Latin, or Greek, or a combination of the two as their major field of study in a Pass course; or students who are reading for honours in another discipline may elect either Latin or Greek as a minor.

Combined Major work or Honours work in either Greek or Latin and another discipline may be arranged upon consultation with the departmental chairmen concerned.

PASS COURSE

Major in Latin: 5 Latin courses to be chosen in consultation with the department; Classics 395; recommended also is Classical Civilization 201 [301].

Major in Greek: 5 Greek courses to be chosen in consultation with the department; Classics 395; recommended also is Classical Civilization 200 [300].

Major in Classics:

Emphasis on Latin: 4 Latin and 3 Greek courses to be chosen in consultation with the Department; Classics 395.

Emphasis on Greek: 4 Greek and 3 Latin courses to be chosen in consultatation with the department; Classics 395.

<div align="center">HONOURS COURSE</div>

First year Arts

The general requirements for First year Arts will be followed, with the following possibilities:

1) A student may be recommended to postpone one requirement until Second year in order to take both Greek and Latin from the beginning of his university course.

2) If his past record so warrants he may be recommended to take a sixth course, thus accomplishing the balance of languages from the start and the reduction of course load in the final year when he is preparing for a general examination.

Second, Third and Fourth years*:

Emphasis on LATIN:

5 further courses in Latin (of which 4 must be in the 200s or 300s)
Classical Civilization 201 [301] (Roman history).
Classics 395 (Seminar).
3 further courses in Greek (of which 2 must be in the 200s or 300s).
4 options in other fields of study.

Emphasis on GREEK:

5 further courses in Greek (of which 3, if 15 was the first taken; or 4, if 100 was the first taken, must be in the 200s or 300s).
Classical Civilization 200 (Greek History).
Classics 395 (Seminar).
3 further courses in Latin (in the 200s or 300s).
4 options in other fields of study.

(In either case, a fifteenth course, in the appropriate grouping for the student's own course pattern, will be necessary, if five courses and not six were taken in First year Arts).

Total: 20 courses in 4 years; of these 4 First year Arts subjects and 4 courses in other Arts years will be non-classical.

Note: At the end of an honours course, students will be required to take a comprehensive examination, either written or oral, to test their general knowledge in the field of Classics.

Offerings for 1962-63 are as follows:

GREEK

Greek 15. [115]. *Introduction to Language and Reading*

A beginning course to introduce students not only to grammar and syntax, but also to the reading of continuous prose.

Day Division: 1962-63 (lectures and practice periods four hours a week).

<div align="right">Professor Swallow</div>

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*Students may enter an honours course later than Second year, but it is likely to involve considerable re-adjustment of the program of Classics and options in the last two years.

GREEK 100. [210]. *Literature and Reading*

Study of the forms and development of Greek literature. *Reading*: Euripides, one play; Lysias, select orations.   Some time will also be devoted to prose composition.

PREREQUISITE: Greek 15 [115] or the equivalent.

Day Division: 1962-63   (lectures three hours a week).

Mr. Robinson

GREEK 300. [320]. *The Historians*

Thucydides and the development of Greek historiography.

PREREQUISITE: A 100 course, or permission of the department.

Day Division: 1962-63   (two tutorial hours a week).

Professor Hodge

GREEK 360. *Comedy*

Aristophanes and his age.

PREREQUISITE: A 100 course, or permission of the department.

Day Division: 1962-63   (two tutorial hours a week).

Mr. Goble

LATIN

LATIN 10. [110]. *Language and Reading*

Review of grammar and syntax; composition. *Reading*: selections from various authors in prose and verse.

PREREQUISITE: Junior Matriculation Latin or the equivalent.   Students without preparation in Latin will *not* be admitted to this class.

Day Division: 1962-63   (lectures three hours a week).

Mr. Robinson

LATIN 100. [210]. *Literature and Reading*

Study of the history of Latin literature. *Reading*: Selections from various authors throughout the classical period.

PREREQUISITE: Latin 10 or the equivalent.

Day Division: 1962-63   (lectures three hours a week).

Professor Hodge

LATIN 280. [370]. *Virgil and the Epic Tradition*

A study of epic throughout the classical period.

PREREQUISITE: A 100 course, or permission of the department.

Day Division: 1962-63   (two tutorial hours a week).

Professor Swallow

LATIN 300. [340]. *Cicero and Roman Oratory*

A study of the art of rhetoric in theory and in practice.

PREREQUISITE: A 100 course, or permission of the department.

Day Division: 1962-63   (two tutorial hours a week).

Mr. Showman

SEMINAR

CLASSICS 395. *Special Problems*

Required of students taking their major work, or reading for Honours, in Classics.

Day Division: 1962-63   (seminars two hours a week).

Professor Hodge

CLASSICAL CIVILIZATION

CLASSICAL CIVILIZATION 200. [300]. *Greece in the Ancient World*

The history and civilization of classical Greece with special attention to the development of her characteristic institutions. (This course is also listed as History 200).

Not offered, 1962-63. This course will be alternated with Classical Civilization 201.

CLASSICAL CIVILIZATION 201. [301]. *Rome in the Ancient World*

The history of ancient Rome, her growth and expansion, and her organization during the Republic and the early Empire. (This course is also listed as History 201).

Evening Division: 1962-63 (lectures two hours a week). This course will be alternated with Classical Civilization 200.

Mr. Robinson

CLASSICAL CIVILIZATION 310. *Greek Literature in Translation*

The development of Greek literature and literary forms from Homer to the Hellenistic period, with extensive reading of Greek authors in English translation.

Day Division: 1962-63 (lectures two hours a week). This course will be alternated with Classical Civilization 311.

Professor Swallow

CLASSICAL CIVILIZATION 311. *Latin Literature in Translation*

The development of Roman literature and literary forms from the earliest times to the early Empire, with extensive reading of Roman authors in English translation.

Not offered, 1962-63. This course will be alternated with Classical Civilization 310.

CLASSICAL CIVILIZATION 320. *A Social and Economic Survey of the Ancient World*

A study of ancient religion, politics, law, trade, slavery, and other institutions characteristic of Greek and Roman society.

PREREQUISITE: Classical Civilization 200 or 201, or the permission of the department.

Not offered, 1962-63; to be offered 1963-64.

Other offerings, given in rotation with the Greek and Latin "200" and "300" courses listed above, are: Greek—150 [250]: Prose Composition; 240 [370]: The Attic Orators; 260 [340]: Philosophy; 280 [330]: The Tragedians; 320 [310]: Homer and Herodotus; 340 [350]: Lyric and Reflective poetry.

Latin—150 [250]: Prose composition; 260 [350]: the Historians; 320 [360]: the writers of Philosophy; 340 [325]: Lyric and Elegy; 360 [315]: Letters; 380 [330]: Comedy and Satire.

COMMERCIAL LAW

Sessional Lecturer . . . . M. E. Corlett, Q.C., B.A.

COMMERCIAL LAW 100. [210]. *Commercial Law*

The law of contract and agency, sale of goods, negotiable instruments, partnerships and companies, bankruptcy and insolvency, bills of sale and chattel mortgages.

Evening Division: Annually (lectures three hours a week). Mr. Corlett

NOTE: Enquiries concerning the course in Commercial Law should be directed to the Chairman of the Department of Economics.

ECONOMICS

Professor . . . . H. S. Gordon, B.A., A.M.
Associate Professor; Chairman of the Department, 1962-63   S. F. Kaliski, M.A., Ph.D.
Associate Professors . . . . . . T. N. Brewis, M.Com., Ph.D.
                                H. E. English, Ph.D. (on leave of absence, 1962-63)
Visiting Professor . . . . William Peters, M.A., B.Ph.D.
Lecturer . . . . Christopher J. Maule, B.A.
Sessional Lecturers . . R. M. Adams, M.A., Ph.D., Albert Breton, B.A.,
                                F. J. Chambers, M.Sc., Ph.D., W. R. Dymond, M.A.,
                                Ph.D., Thomas K. Rymes, M.A., Derek A.
                                White, B.A.

The Economics courses are divided into six categories:
1. Economics 100 — to be taken in First year.
2. Basic courses in theory, economic history and statistics. Economics 200, 210, 225 (or 325), and 220 — appropriately taken in Second year.
3. Second or Third year options — courses numbered 325-399.
4. Senior options — courses numbered 400-479 — normally taken in Third or Fourth year (also see Graduate Studies).
5. Special honours courses — courses numbered 480-499 — for honours students only.
6. Graduate seminars and thesis — Economics 500, 530, and 580.

Students who wish to major or take honours in Economics will be expected to fulfil summer reading requirements.

Students seeking admission to the major or honours programs in Economics will normally be expected to have credits in Grade 13 Mathematics (Algebra, Geometry and Trigonometry), or the equivalent.

MAJOR COURSE

A student will normally be permitted to major in Economics only if he or she obtained a 'C' grade in Economics 210.

Students who major in Economics will normally take at least six Economics courses — categories 1 and 2 and at least one course from category 4. One of the category 2 courses may be postponed to Third year. The student's program for the Second and Third years must be approved by the Chairman of the Department of Economics.

HONOURS COURSES

Economics. Honours programs may be entered from the Honours First year in the Social Sciences (see pp. 73-75), or by transfer from the major course if second class standing has been obtained.

The honours requirement includes courses in categories 1 and 2, at least two from category 4, and the modern classics tutorial and honours essay (category 5). Each student will be assigned a tutor in his Third and Fourth years. There will be a comprehensive examination (written and oral) at the end of the final year. Honours students will not be required to write final examinations in their Economics courses in their Third and Fourth years.

The student's program for the Second and subsequent years will be planned in consultation with the Chairman of the Department of Economics.

Combined Honours in Economics and Political Science: Students intending to take this course should take Economics 100 or Political Science 100 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two departments. The honours requirements include at least six courses in Economics and six courses in Political Science,

one of which must be Political Science 490 or Economics 495, to be taken in the student's final year. These will be arranged so that the student may transfer either to full honours in Economics or to full honours in Political Science at the end of the Third year, if he then wishes to specialize more intensively.

Consideration will also be given to applications for Combined Honours in Economics and History, and Economics and Sociology.

<div align="center">GRADUATE STUDIES</div>

The Department of Economics offers studies leading to the degree of Master of Arts with specialization in any of the following fields:

Money and Banking, Public Finance, International Trade, Natural Resources, Industrial Organization and Public Policy, Comparative Political Economy, History of Economic Thought.

A student wishing to enter the M.A. program must have an honours degree in Economics or its equivalent in both content and standing. A candidate may be required to supplement his basic undergraduate work by taking appropriate undergraduate courses at Carleton in addition to his work for the M.A. A student holding a pass degree and no further training will ordinarily be required to take a qualifying year before being admitted to M.A. candidacy.

A candidate for the M.A. in economics will (1) take the two graduate seminars and an approved course from category 4 (in which additional work may be assigned), (2) present a thesis and (3) pass comprehensive examinations. Grades of B or better must be obtained throughout in courses, comprehensives, and thesis. At present the graduate program is offered in the evening division only, and a student entering the M.A. program without conditions will normally take three years to complete his requirements for the degree. Beginning in 1963-64, it will be possible to complete the requirements in one year of full-time study.

ECONOMICS 100. [210]. *Principles of Economics*

An introduction to the concept of economic welfare and its relation to society's other economic goals, e.g. the efficient use and allocation of resources, an appropriate rate of growth of production, and stability in output, employment, and prices. The basic principles and statistical measures used in explaining these goals and the means of achieving them are discussed. Public policies affecting the distribution of income, the control of monopoly, and the maintenance of stability in employment and prices are also discussed.

Day Division: Annually (lectures and classes, three hours a week).

Evening Division: Annually (lectures and classes, three hours a week).

Summer Session: 1962 (lectures five hours a week).

<div align="right">Professor Gordon, Mr. Maule and others</div>

ECONOMICS 200. [300]. *Price Theory*

The modern analysis of production and distribution with special reference to the determination of the conditions which maximize social welfare. The major causes of departure from the social welfare optimum in a full employment economy, with particular attention to imperfections in competition.

PREREQUISITE: Economics 100.

Day Division: Annually (lectures two hours a week).

Evening Division: 1962-63 (lectures two hours a week).

<div align="right">Professor Peters and Mr. White</div>

ECONOMICS 210. [310]. *Monetary Theory and Institutions*

The theory and practice of banking and finance, with special reference to the economic functions of financial institutions. The theory of monetary policy and central banking and its Canadian applications. The analysis of major problems of an organizational nature: inflation and unemployment. The theory and practice of international finance.

PREREQUISITE: Economics 100.

Day Division: Annually (lectures three hours a week).

Summer Session: 1962 (lectures five hours a week).

<div align="right">Professors Brewis and Gordon</div>

ECONOMICS 220. [320]. *Statistical Methods in the Social Sciences*

An introduction to the principal statistical measurements. The use of statistical analysis as a method for the precise and reliable acquisition of knowledge in the social sciences will be stressed. The misuse of statistical information will be examined. (This course is listed also as Sociology 205. Economics 220 will yield a half credit only, if Mathematics 255° has been taken for credit and will yield no credit if Psychology 205 has been taken for credit).

PREREQUISITES: Mathematics 30, and one of Economics 100, Political Science 100, Sociology 100; *or* the permission of the instructor.

Day Division: Annually (lectures two hours a week, laboratory two hours a week).

Evening Division: 1962-63 (lectures two hours a week, laboratory two hours a week).

Professor Kaliski

ECONOMICS 225. [315]. *Economic History*

(offered in the Department of History as History 225). See notation as History 225.

An examination of the development of economic institutions since the Middle Ages, especially those aspects of history which may be used to explain the character of the principal economic institutions and practices of the present day. (This course is also listed as History 225).

PREREQUISITE: Economics 100, *or* the permission of the instructor.

Evening Division: 1962-63 (lectures two hours a week).

Dr. Chambers

ECONOMICS 316*. [331]. *Theory of Economic Growth*

An introduction to contemporary developments in the theory of economic growth. Several recent growth models and their antecedents are examined, compared, and criticized. (Half course.)

PREREQUISITES: Economics 100, and preferably Economics 210.

Evening Division: 1962-63 (lectures two hours a week, *first* term).

Mr. Rymes

ECONOMICS 321*. [341]. *National Accounting*

An introduction to the principles of national accounting, including a study of national income and expenditure accounts, input-output accounts, and national transactions (money flows) accounts, with emphasis on Canadian practice. (Half course).

PREREQUISITE: Economics 100.

Evening Division: 1962-63 (lectures two hours a week, *second* term).

Mr. Rymes

ECONOMICS 325. [360]. *The Economic Development of Canada*

This course is designed as an advanced course in the economic history of Canada and will stress the influence of geography and the impact of ideas and institutions from other areas upon North American development. (This course is also listed as History 325).

PREREQUISITE: Economics 100 or History 230 or 235.

Not offered, 1962-63.

ECONOMICS 326*. [386]. *Problems of Development*

An examination of the conditions of growth in production and economic welfare. Special attention is devoted to the difficulties of underdeveloped areas and to attempts to overcome these difficulties. (This course is appropriately taken following Economics 316). (Half course.)

PREREQUISITE: Economics 100, and the permission of the instructor.

Evening Division: 1962-63 (lectures two hours per week, *second* term).

Professor Brewis

ECONOMICS 346*. [366]. *Business Finance*

The financing of business enterprise, the capital and stock markets and other financial institutions. The influence of government on the direction and financing of investment. (Half course.)

PREREQUISITE: Economics 100.

Not offered, 1962-63.

ECONOMICS 355. [380]. *Labour Economics and Industrial Relations*
An examination of the position of the labourer in the Canadian economy and of the economic and sociological theory related to this study. The place and function of the government in the relationship between management and labour, trade unions — their aims and history. Collective bargaining — its purpose and meaning to industry and to labour.
PREREQUISITE: Economics 100.
   Evening Division: 1962-63 (lectures two hours per week).
                                          Dr. Dymond and Dr. Adams

ECONOMICS 400. *Mathematical Economics and Econometrics*
An introduction to some of the simpler mathematical models of economic theory and to estimates based upon them. Both aggregative and micro-economic models will be considered. Attention will be divided between formal aspects of the models and estimating procedure. Students will be assumed to have an adequate knowledge of elementary calculus and simpler algebra, but other mathematical tools will be developed as they are needed.
PREREQUISITE: Economics 200 and 220; Mathematics 130 or 100; and the permission of the instructor.
   Day and Evening Divisions: 1962-63 (lectures and problems, three hours a week).
                                                     Professor Kaliski

ECONOMICS 415. [420]. *History of Economic Thought*
The principal developments in economic theory and doctrine especially during the nineteenth century. The principal theorists and the influential popular writers of the period. The relation of economic theory and doctrine to contemporaneous social, political, and philosophical ideas and to economic and political events.
PREREQUISITE: Economics 200 and the permission of the instructor.
   Evening Division: 1962-63 (lectures and seminars, two hours a week).
                                                     Professor Gordon

ECONOMICS 430. *Industrial Organization and Public Policy*
An analysis of the organization of Canadian industry, with reference to associated U.S. industry where necessary. A few representative industries are examined in some detail. Price theory is used to distinguish economic from institutional factors affecting the structure of the economy. Emphasis is laid upon public policies which affect, intentionally or otherwise, the organization and behaviour of industry, e.g., public utility regulation, control of restrictive practices, commercial policy, and price supports.
PREREQUISITE: Economics 200.
   Day and Evening Divisions: 1962-63 (lectures two hours a week).
                                                        Mr. Maule

ECONOMICS 440. *Public Finance*
The place of public expenditures and revenue in the national economy, taxation, debt management, and the role of fiscal policy in economic stabilisation.
PREREQUISITE: Economics 200 or 210.
   Evening Division: 1962-63 (lectures two hours a week).
                                                      Professor Peters

ECONOMICS 450. *Economic Fluctuations and Stabilization Policy*
An analysis of the nature and causes of fluctuations in income, employment and prices, and related government policy. Some consideration of the problems and techniques involved in economic forecasting.
PREREQUISITE: Economics 210.
   Day Division: 1962-63 (lectures two hours a week).
                                                      Professor Brewis

ECONOMICS 460. *International Trade*
An examination of the theory of international trade and payments and its applications. The current body of theory and its historical development are discussed, as are a number of attempts to verify and quantify the theory. A number of present day problems, policies, and institutions are examined in the light of the theory and empirical findings.
PREREQUISITE: Economics 200.
   Not offered, 1962-63.

ECONOMICS 470. *Comparative Political Economy*
A discussion of the relationship between ideology, economic theory, and actual organization in the principal contemporary economies. The course includes a comparative study of the origin, structure and operation of the economic institutions of the United States and Canada, the Soviet Union, the United Kingdom, and other economies.
PREREQUISITE: Economics 200.
   Day Division: 1963-64 and alternate years.

Economics 480. *Tutorial in Modern Classics*

> An honours student will be expected, usually in his final year, to read a group of original works selected in consultation with a member of the Department assigned as tutor. The student will meet regularly with his tutor to discuss his reading and to read papers based upon it.

PREREQUISITE: Permission of the Chairman of the Department.

> *Day Division*: Annually (tutorial hours arranged).

Economics 485. *Tutorial in Economics*

> An additional tutorial in economics may be taken subsequent to or concurrently with Economics 480. A program of study will be designed to accord with the student's individual needs.

PREREQUISITE: Permission of the Chairman of the Department.

> *Day Division*: Annually (tutorial hours arranged).

Economics 495. *Honours Essay*

> A student taking honours in economics must write an honours essay during his final year. The essay will count for one or two course credits.

PREREQUISITE: Permission of the Chairman of the Department.

Economics 500. *Advanced Economic Theory*

> *Evening Division*: Annually (seminars two hours a week).

> > > > > > > > > > > > > > > > Professor Kaliski

Economics 530. [510]. *Applied Economics: currently, The Canadian Economy*

> *Evening Division*: 1963-64 and annually thereafter.

Economics 580. *M.A. Thesis*

ENGINEERING

Professor, Director of the School . . . John Ruptash, B.Sc., M.A.Sc., Ph.D.

Assistant Professor, Assistant Director . . S. G. Tackaberry, C.B.E., B.A.Sc.

Associate Professors . . . . . . W. H. Bowes, B.Eng., M.Eng., M.Sc.
E. E. Goldsmith, Dipl.Ing., D.I.C.
Malcolm A. Gullen, B.Sc., M.S.
D. A. J. Millar, B.A.Sc., S.M., M.E., Sc.D.
R. Putnaerglis, Mech.Eng., M.Eng., P.Eng.

Assistant Professors . . . . D. A. George, B.Eng., M.S., Sc.D.
H. Majmudar, B.Sc., D.I.I.Sc., M.S.E.E., Ph.D., K. Van Dalen, B.Sc., D.I.C.,
M.Sc., Whitman Wright, B.A.Sc.

Sessional Lecturers . . . . D. W. Brooks, B.Sc.
M. S. Chappell, B.A.Sc., E. P. Cockshutt, B.A.Sc., S.M., Mech.Eng., Sc.D.,
D. C. Coll, M.Eng., C. B. Crawford, M.Sc., D.I.C., G. J. Klein, B.A.Sc.,
B. B. MacNabb, B.Sc., D.L.S., P. Mandl, Ph.D., W. H. McCreary, B.A.Sc.,
M.Com., R. F. Meyer, B.Eng., Ph.D., W. J. Rainbird, B.Eng., D.C.A., John
Rolfe, B.Sc., Ph.D., J. H. Simpson, B.Eng., Ph.D., H. W. Smith, B.A.Sc., Sc.D.,
D. G. Stephenson, B.A.Sc., Ph.D., R. J. Templin, B.A.Sc., Hans J. von
Baeyer, Ph.D.

Candidates for the Bachelor of Engineering degree are required to complete a program of study covering four years after Senior Matriculation. The admission requirements and programs of study for each of the four years are outlined on pp. 66-69.

ENGINEERING 100.   *Engineering Drawing*

Selection and use of instruments; lettering; applied geometry; orthographic projection; freehand and instrument drawing; auxiliary and oblique views; sections and conventions; pictorial sketching and drawing including isometric, oblique and perspective; dimensions and notes, including precision and limit dimensioning; screw threads; fasteners; use of piping and welding symbols; detail and assembly drawings; elements of structural drawings; descriptive geometry including point, line, plane problems, curved and warped surfaces, intersections and developments; use of reference books, handbooks and catalogues; introduction to simplified practice in engineering drawing.

Lectures 1 hour a week, *both* terms.

Laboratory 5 hours a week, *both* terms.

TEXTS: French and Vierck, *Engineering Drawing*, 9th Edition.
Wellman, *Technical Descriptive Geometry*, 2nd Edition.

Professor Tackaberry

ENGINEERING 105.   *Surveying*

Surveying principles and practice: measurements of distance, differences in elevation, angles and directions; theory, use, and adjustments of principle surveying instruments; theory of errors and weighted measurements; engineering surveys: profiles, cross sections, earthwork, horizontal and vertical curves; use of rectangular co-ordinates in surveying; area computations by surveying methods; principles of aerial photogrammetry.

Lectures 2 hours a week, *second* term.

TEXT: Davis and Foote, *Surveying*, 4th Edition.

Mr. MacNabb

ENGINEERING 106.   *Surveying Field Work*

Precision chaining, precision and construction levelling, contour maps by stadia, traverse measurements, plan and profile of a city street, calculating and staking of a circular curve, slope stakes and grades, drawing plans and profiles.

Two and one-half weeks at the end of *second* term.

Mr. Brooks

ENGINEERING 107.   *Introduction to Machine Tools*

Introduction to the use and capabilities of gauges, hand and machine tools including drill press, engine lathe, shaper, milling machine and grinder. Use of jigs and fixtures. To supplement the instruction, explanation and demonstration by the instructor, each student is given some practice in the operation of each type of machine

Laboratory and lectures 4 hours alternate weeks, *first* term.

Mr. Anderson and Mr. Clark

ENGINEERING 110.   *Mechanics I*

Composition and resolution of forces and force systems; principles of equilibrium; analytical and graphic determination of forces in simple frame structures; suspended cables; center of gravity and centroids; friction.

Lectures 3 hours a week, *second* term.

TEXT: Langhaar and Boresi, *Engineering Mechanics*.

Professor Bowes

ENGINEERING 203. *Field Trip*

An inspection tour of research laboratories, industries, hydroelectric installations, etc., of about one week duration at the end of the second term.

Members of the Staff

ENGINEERING 211. *Mechanics II*

Three-dimensional theory of statics; work; virtual work; stable equilibrium; kinematics and dynamics of a particle; momentum principles; kinematics and dynamics of rigid bodies; principles of work and energy.

Lectures 2 hours a week, *both* terms.

Problem analysis 3 hours alternate weeks, *both* terms.

TEXT: Langhaar and Boresi, *Engineering Mechanics.*

REFERENCE: Beer and Johnston, *Mechanics for Engineers.*

Professor Bowes

ENGINEERING 220. *Mechanics of Materials I*

Stress; strain; factor of safety; Hooke's Law for normal and shearing stresses; Poisson's ratio: torsion of circular, rectangular and thin-walled members; plastic behaviour in torsion: stress concentrations; shear force and bending moment diagrams; flexural and shear stresses in beams; shear in I-beams: deflection of beams by double integration and moment area: combined axial and bending stresses: plane stress and strain; Mohr's circle; principal stresses and strains; thin-walled pressure vessels; introduction to electrical resistance strain gauges.

Lectures 3 hours a week, *first* term.

Problem analysis and laboratory 3 hours a week, *first* term.

TEXT: Popov, *Mechanics of Materials.*

REFERENCE: Higdon, Olsen and Stiles, *Mechanics of Materials.*

Professor Van Dalen

ENGINEERING 240. *Engineering Thermodynamics*

Basic concepts of heat, work, temperature, property, state, system, control volume. The First Law and steady flow energy equation and applications. Properties of pure substances, phase diagrams. The Perfect Gas Laws and relations. The Second Law and its corollaries; entropy and availability. Introduction to power and refrigeration cycles. Properties of mixtures, psychrometry.

Lectures 3 hours a week, *second* term.

Problem analysis and laboratory 3 hours a week, *second* term.

TEXT: Jones and Hawkins, *Engineering Thermodynamics.*

REFERENCES: Spalding and Cole, *Engineering Thermodynamics.*
Keenan, *Thermodynamics.*
Soo, *Thermodynamics of Engineering Science.*

Dr. Cockshutt and Professor Millar

ENGINEERING 265. *Introduction to Computer Programming*

The concept of a data processing program. The stored program. Introduction to the 1620 Data Processing System; machine organization; memory, instruction and field addresses. Machine language programming; instruction format, input/output, arithmetic and control operations. Decisions, loops and branches. Flow Charts. Automatic coding systems. Programming with the FORTRAN language. Laboratory sessions are devoted to demonstrations and programming exercises.

One week at the end of the *second* term.

TEXT: McCracken, *A Guide to FORTRAN Programming.*

Professors Gullen and Millar

ENGINEERING 312. *Mechanics of Machines I*

Introduction to mechanisms; simple, compound and epicyclic gear trains; static and dynamic balance — rotors and reciprocating engines; mechanical vibration — free and forced vibration, damping, systems having one and two degrees of freedom.

Lectures 2 hours a week, *second* term.

TEXT: Mabie and Ocvirk, *Dynamics of Machinery.*

REFERENCES: Timoshenko, *Vibration Problems in Engineering.*
Ham, Crane and Rogers, *Mechanics of Machinery.*

Professor Bowes

ENGINEERING 321. *Mechanics of Materials II*

Statically indeterminate problems in tension and compression, thermal stresses; concentrically and eccentrically loaded connections with rivets, bolts or welds in shear or tension; plastic bending of beams, beams of two materials, unsymmetrical bending, shear center; deflection due to unsymmetrical bending, deflection due to shear; introduction to strain energy; statically indeterminate problems in bending by the method of superposition, continuous beams with elastic supports or settlement of supports; the Euler formula for columns, effective column length, the tangent modulus formula, the secant formula, design formulas for columns; lateral buckling of beams; design for combined compression and bending; triaxial stresses, failure theories; the effect of high and low temperatures on metals; fatigue.

Lectures 2 hours a week, *second* term.

Problem analysis and laboratory 3 hours a week, *second* term.

TEXT: Timoshenko and Young, *Elements of Strength of Materials.*

REFERENCE: Popov, *Mechanics of Materials.*

Professor Wright

ENGINEERING 330. *Fluid Mechanics*

Fundamental concepts; properties of fluids; fluid statics; fluids in relative equilibrium; fundamental equations for steady one-dimensional nonviscous incompressible flow; selected applications; dimensional analysis, dynamic similarity; laminar flow, turbulent flow, boundary layer, skin friction and drag estimation; pipe line problems; open channel flow; one-dimensional steady isentropic flow, shock waves; elements of two-dimensional steady non-viscous incompressible flow. The lectures are supplemented by assigned problems and laboratory exercises.

Lectures 2 hours a week, *both* terms.

Laboratory 3 hours alternate weeks, *both* terms.

REFERENCES: Binder, *Fluid Mechanics.*
Streeter, *Fluid Mechanics.*
Vennard, *Elementary Fluid Mechanics.*

Professor Ruptash

ENGINEERING 341. *Introduction to Heat Transfer*

Modes of heat flow; one- and two-dimensional steady state conduction, analytical, analog and relaxation solutions; radiation, heat exchange between black and gray surfaces, radiation from real surfaces; free and forced convection, heat transfer with phase change. Relationship between mass, momentum and energy transfer. Introduction to non-steady state heat transfer.

Lectures 2 hours a week, *first* term.

Laboratory 3 hours a week, alternate weeks, *first* term.

TEXT: Kreith, *Principles of Heat Transfer.*

REFERENCES: Eckert and Drake, *Heat and Mass Transfer.*
McAdams, *Heat Transmission.*

Dr. Stephenson and Professor Millar

ENGINEERING 350. *Fundamentals of Electric Circuits and Machines*

D.C. and A.C. circuits; complex algebra; harmonics; Fourier series; Thevenin's theorem; applications of complex notation; power in A.C circuits; frequency response and resonance; maximum power conditions; polyphase circuits, star-delta relationships; transients in D.C. and A.C. circuits; series and parallel magnetic circuits; D.C. and A.C. excitation; hysteresis and eddy currents; saturable core reactors; transformers; equivalent circuits; D.C. machines; induction motors; synchronous machines; instrumentation; transmission; control systems; mercury arc rectifiers.

Lectures 3 hours a week, *both* terms.

Problem analysis 3 hours a week, *first* term.

Laboratory 3 hours alternate weeks, *second* term.

REFERENCES: Fitzgerald and Higginbotham, *Basic Electrical Engineering.*
Clement and Johnson, *Electrical Engineering Science.*
Fitzgerald and Kingsley, *Electric Machinery.*

Professor Goldsmith

ENGINEERING 357. *Electronics 1*

Electron ballistics. Conduction in metals and semiconductors. Thermionic emission. The vacuum diode and the semiconductor diode. Gas-filled tubes. Regulators, rectifiers and power supplies. Vacuum triode and transistor triode characteristics. Linear equivalent circuits. Small signal and audio power amplifiers employing tubes and transistors. Magnetic amplifiers. Vacuum tetrode and pentode characteristics. Transistor performance at higher frequencies. Feedback amplifiers and oscillators.

Lectures 3 hours a week, *second* term.

Problem analysis and laboratory 3 hours a week, *second* term.

TEXT: Millman, *Vacuum-tube and Semiconductor Electronics.*

Professor George

ENGINEERING 366. *Computer Applications*

Selected topics in numerical analysis, including linear systems and matrices, iterative methods of solution of linear equations, iterative methods of root-finding, computation with series and integrals, numerical solution of differential equations. Selected topics in Engineering Analysis which are amenable to computer solution. Laboratory sessions are devoted to the solution of two substantial problems using the 1620 Data Processing System, with pairs of students working as independent groups.

Lectures 3 hours a week, *first* term.

Laboratory 3 hours alternate weeks, *first* term.

TEXT: Stanton, *Numerical Methods for Science and Engineering.*

REFERENCE: Ralston and Wilf, *Mathematical Methods for Digital Computers.*

Professors Gullen and Millar

ENGINEERING 370. *Metallurgy 1*

Atomic and crystalline structure of metals. Movements of atoms; diffusion. Relationships between like and unlike atoms; alloys; conductors and semiconductors; phases; phase diagrams. Grains, their growth, size, shape, deformation; recrystallization; effects on physical properties. Dislocations; micro-aspects of strength and ductility. Typical metallurgical reactions, including heat treatment.

Lectures 2 hours a week, *first* term.

Laboratory 3 hours alternate weeks, *first* term.

TEXT: Guy, *Elements of Physical Metallurgy.*

REFERENCE: Cottrell, *Theoretical Structural Metallurgy.*

Professor Putnaerglis

ENGINEERING 401. *Mechanical Analysis and Design*

Stress analysis; design factors; properties of materials; stress concentration, notch sensitivity and fatigue; curved beams; columns with axial and transverse loading; power screws; screw fastenings and connections subject to variable loads; shafts; funicular polygon method of determining the elastic curve and critical speed of shafts — general case; springs; journal and plane bearings; rolling bearings; belt and chain drives; spur, helical, bevel, hypoid and worm gearing; couplings, brakes and clutches.

Lectures 2 hours a week, *both* terms.

Problem analysis 3 hours a week, *both* terms.

TEXT: Faires, *Design of Machine Elements.*

REFERENCES: Merritt, *Gears.*
                        Shigley, *Machine Design.*

Mr. Klein and Professor Bowes

ENGINEERING 413. *Mechanics of Machines 11*

Cams; gear profile theory; helical, bevel and worm gears; velocity and acceleration of machine elements; instantaneous centers; forces in machine elements due to external loads and inertia of elements.

Lectures 2 hours a week, *first* term.

Problem analysis 3 hours alternate weeks, *first* term.

TEXT: Mabie and Ocvirk, *Dynamics of Machinery.*

REFERENCE: Shigley, *Theory of Machines.*

Professor Bowes

ENGINEERING 422. *Structural Analysis*

Review of plane statics; advanced analysis of statically determinate plane trusses; moving loads and influence lines; statically determinate space structures; analysis of elastic systems by energy methods; deflection of trusses by graphical and analytical methods; statically indeterminate pin-jointed trusses; analysis of rigid frames with prismatic or haunched members by slope deflection and moment distribution; arches; analysis of rigid frames for plastic design; the column analogy; guyed towers.

Lectures 3 hours a week, *both* terms.

TEXT: Timoshenko and Young, *Theory of Structures.*

REFERENCE: Norris and Wilbur, *Elementary Structural Analysis.*

Professor Wright

ENGINEERING 423. *Reinforced Concrete*

Properties of concrete; mix design and use of admixtures; derivation of elastic design equations; rectangular beams with tensile and compressive reinforcement; diagonal tension; shear; bond; design of web reinforcements; design of T beams, two-way and flat slabs; concentrically and eccentrically loaded columns; creep and temperature stresses; introduction to plastic design; design of floor framing system with emphasis on detailing and familiarization with current specifications.

Lectures 3 hours a week, *second* term.

Problem analysis and laboratory 3 hours a week, *second* term.

TEXT: Ferguson, *Reinforced Concrete Fundamentals.*

REFERENCE: Urquhart, O'Rourke and Winter, *Design of Concrete Structures.*

Professor Van Dalen

ENGINEERING 424. *Soil Mechanics*

Theoretical development of the science of soil mechanics. Historical development; soil classification; compaction and stabilization; permeability and seepage; stresses in soil, bearing capacity and earth pressures; ground temperatures and frost action; theory and application of consolidation; strength of soils in terms of effective stresses and methods of determination. The effect of time on test results and stability analysis is discussed. The lectures are supplemented by assigned problems and laboratory exercises.

Lectures 3 hours a week, *first* term.

Laboratory 3 hours alternate weeks, *first* term.

TEXT: Capper and Cassie, *Mechanics of Engineering Soils.*

REFERENCES: Terzaghi, *Theoretical Soil Mechanics.*
Bishop and Henkel, *Measurement of Soil Properties in Triaxial Test.*

Mr. Crawford and Professor Van Dalen

ENGINEERING 425. *Structural Design*

Load analysis; special problems in the design of tension members, compression members and beams; design of plate girders, trusses and floor and roof systems; advanced design of riveted, bolted and welded connections; design of buildings including industrial and multistory buildings; design of girder and truss bridges; introduction to plastic design; design in timber; economic considerations and cost estimates.

Lectures 2 hours a week, *both* terms.

Problem analysis and laboratory 3 hours a week, *both* terms.

TEXT: Gaylord and Gaylord, *Design of Steel Structures.*

REFERENCES: *A.I.S.C. Steel Construction Manual.*
National Building Code of Canada.
Hansen, *Modern Timber Design.*

Professor Wright

ENGINEERING 428. *Foundation Engineering*

Selection and design of footings, raft, pile and pier foundations: design of retaining walls; abutments; shoring and underpinning for various soil conditions.

Lectures 2 hours a week, *second* term.

Problem analysis 3 hours alternate weeks, *second* term.

TEXT: Peck, Hansen and Thornburn, *Foundation Engineering.*

REFERENCE: Terzaghi and Peck, *Soil Mechanics in Engineering Practice.*

Professor Van Dalen

ENGINEERING 429. *Highway Engineering*

Planning and geometric design of highways; design of subgrade and subgrade structures, design of stabilized road surfaces, design and maintenance of bituminous and concrete pavement; operational traffic engineering.

Lectures 2 hours a week, *first* term.

Problem analysis 3 hours alternate weeks, *first* term.

TEXT: Hewes and Oglesby, *Highway Engineering.*

Professor Wright

ENGINEERING 431. *Hydrology*

Hydrologic cycle: analysis of precipitation data; derivation of intensity-duration curves: stream gauging; stage-discharge relationships; unit hydrograph analysis of peak runoff; overland flow and concentration-time methods of determining peak discharge: infiltration capacity curves; runoff percentage and ϕ-index methods of determining net storm rain: submerged and broad crested and proportional weirs: venturi and Parshall flumes: backwater curves: discussion of water hammer and surge.

Lectures 2 hours a week, *first* term.

Laboratory 3 hours alternate weeks, *first* term.

REFERENCES: Butler, *Engineering Hydrology.*
Rouse, *Engineering Hydraulics.*
Jaeger, *Engineering Fluid Mechanics.*

Professor Van Dalen

ENGINEERING 432. *Fluid Dynamics*

Foundations of fluid dynamics, two-dimensional steady nonviscous incompressible flow, isentropic flow, normal and oblique shock waves, adiabatic flow in nozzles and diffusers, methods of measurement in high speed flow, viscous flows and boundary layer theory, diabatic flow. The lectures are supplemented by assigned problems.

Lectures 3 hours a week, *first* term.

REFERENCES: Dommasch, *Principles of Aerodynamics.*
Liepmann and Roshko, *Elements of Gasdynamics.*
Kuethe and Schetzer, *Foundations of Aerodynamics.*
Shapiro, *Dynamics and Thermodynamics of Compressible Fluid Flow*, Vol. I.

To be announced

ENGINEERING 435. *Hydraulic Engineering*

Streamflow routing — wave movement, channel storage, channel and reservoir routing: hydrologic aspects of reservoir, spillway and storm drainage design; river forecasting and river control works: hydraulics of spillways, gates and outlet works; erosion, sediment transport, reservoir sedimentation.

Lectures 2 hours a week, *second* term.

Problem analysis 3 hours alternate weeks, *second* term.

REFERENCES: Linsley, Kohler and Paulhus, *Applied Hydrology.*
Elevatorski, *Hydraulic Energy Dissipators.*

ENGINEERING 437. *Airplane Performance, Static Stability and Control*

Introduction to mechanics of flight; elements of theoretical and experimental aerodynamics; aerodynamic characteristics of airfoils and wings at low and high speeds, airplane drag estimation; performance characteristics of propulsive systems; airplane performance analysis including take-off, landing, rate of climb, maximum speed, range, endurance, etc.; static stability and control problems and analysis.

PREREQUISITE: Engineering 430 or equivalent.

Lectures 3 hours a week, *first* term.

REFERENCES: Dommasch, Sherby and Connolly, *Airplane Aerodynamics.*
Carrol, *The Aerodynamics of Powered Flight.*

Mr. Templin

ENGINEERING 439. *Sanitary Engineering*

Quantity and quality of water supplies; clarification and filtration of water: disinfection methods: physical and chemical characteristics of sewage; sewage disposal; primary sewage treatment; secondary treatment methods including filtration and activated sludge; sludge digestion: discussion of problems introduced by industrial wastes.

Lectures 2 hours a week, *first* term.

Problem analysis and laboratory 3 hours alternate weeks, *first* term.

TEXT: Steel, *Water Supply and Sewerage.*

ENGINEERING 442. *Applied Thermodynamics*

Properties of non-reactive mixtures; psychrometry. Properties of reactive mixtures; combustion and stoichiometry. Heat engine cycles and plants; Rankine cycle, steam cycle, mercury and binary cycle; steam plants, convention and nuclear. Vapour refrigeration cycles and plants, heat pumps. Otto and Diesel cycles, internal combustion engines; spark and compression ignition; free piston gas generators. Supercharging and compounding. Brayton cycle; simple and regenerative gas turbine cycles. Jet propulsion, afterburning, ramjets. Air cycle refrigerators. Introduction to fluid dynamics and thermodynamics of turbomachinery. Turbine and compressor stage design. Characteristics; matching and off-design performance.

Lectures 3 hours a week, *both* terms.

Laboratory and problem analysis 3 hours alternate weeks, *both* terms.

REFERENCES: Van Wylen, *Thermodynamics.*
Soo, *Thermodynamics of Engineering Science.*
Shepherd, *Principles of Turbomachines.*
Shapiro, *Compressible Fluid Flow,* Vol. I.
Stoecker, *Refrigeration and Air Conditioning.*
Professor Millar and Mr. Chappell

ENGINEERING 443. *Energy Conversion*

Conversion of matter into energy. Energy from nuclear fission reactors. Development of nuclear fusion (thermo-nuclear) reactors. Natural and artificial collectors of solar energy. Hydro, tidal and wave power stations. Wind power plants. Photoelectric batteries. Geothermal and low-thermal-head stations. Thermoelectric, thermionic and magneto-hydrodynamic energy conversion. Fuel cells. Other unconventional power sources. Storage of surplus energy. Electrical and electromagnetic energy conversion. Selected topics from steam power, heat transfer, and economics of energy conversion.

Lectures 3 hours a week, *second* term.

Laboratory 3 hours alternate weeks, *second* term.

REFERENCES: Kaye and Welsh, *Direct Conversion of Heat to Electricity.*
Skrotzki and Vopat, *Applied Energy Conversion* (2nd Ed.).
Solberg, Cromer and Spalding, *Thermal Engineering.*
Ku, *Electric Energy Conversion.*
White and Woodson, *Electromechanical Energy Conversion.*
Schenck, *Heat Transfer Engineering.*
Lapp and Andrews, *Nuclear Radiation Physics* (2nd Ed.).
Professor Putnaerglis

ENGINEERING 447. *Refrigeration and Air Conditioning*

Psychrometry; comfort; refrigeration methods and equipment; humidification control methods and equipment; distribution systems, ducts, pipes, fans, pumps, filters; system planning and design; automatic controls. Residential, commercial and industrial systems.

Lectures 2 hours a week, *second* term.

Problem analysis 3 hours alternate weeks, *second* term.

REFERENCES: Stoecker, *Refrigeration and Airconditioning.*
Carrier, Cherne, Grant and Roberts, *Modern Airconditioning, Heating and Ventilating.*
To be announced

ENGINEERING 451. *Linear Network Theory*

Introduction to linear network theory using complex variables and Laplace transforms. Emphasis is placed on deriving the inverse of Laplace transforms by contour integration. Topics discussed include: elements of the theory of complex variables, direct Laplace transforms, Fourier transforms, complex inversion integral; network topology, analysis and theorems. Complete response of linear networks to excitations of arbitrary wave forms. Two port networks. Analytic properties of network functions. Signal flow graphs. Elements of feedback theory.

Lectures 2 hours a week, *both* terms.

Problem analysis 3 hours a week, *second* term.

REFERENCES: Seshu and Balabanian, *Linear Network Analysis.*
Stewart, *Fundamentals of Signal Theory.*

Professor Ma'mudar

ENGINEERING 452. *Instrumentation, Measurement and Control*

Measurement of physical, electrical and thermal properties of materials and systems. Modern instrumentation techniques. Control of mechanical processes. Input, output and transfer functions. Mechanical, electromechanical, pneumatic and hydraulic control components and systems. On-off, proportional, proportional-plus-reset and anticipatory control systems. Response, error and stability of systems.

Lectures 1 hour a week, *second* term.

Laboratory 3 hours a week, *second* term.

REFERENCES: Becksmith and Buck, *Mechanical Measurements.*
Dean, *Aerodynamic Measurements.*
Lynch and Truxal, *Principles of Electronic Instrumentation*
Raven, *Automatic Control Engineering.*

Professor Putnaerglis

ENGINEERING 453. *Electric Transmission and Radiation*

Theory of transmission of electromagnetic waves along linear conductors; basic differential equations and their solution, line constants and transmission parameters, elements of matching under steady state and transient conditions. Application of transmission lines; power lines, telephone and telegraph lines, radio frequency lines, wave guides. Transition from guided to radiated wave propagation. General theory of antennas, arrays, apertures and reflectors. Transmission formulae for free space propagation.

Lectures 3 hours a week, *second* term.

TEXTS: Skilling, *Electric Transmission Lines.*
Kraus, *Antennas.*

REFERENCES: Kimbark, *Electrical Transmission of Power and Signals.*
Jordan, *Electromagnetic Waves and Radiating Systems.*
Reference Data for Radio Engineers, 4th Ed. Federal Telephone and Radio Corp.
Principles of Electricity, American Telephone & Telegraph Co., Northern Electric Co.

Dr. von Baeyer

ENGINEERING 454. *Electromagnetic Fields*

Development of Maxwell's equations in differential form. Topics discussed include: vector analysis, electrostatics, simple solutions of Laplace's equations, magnetostatics, electrodynamics. Application of Maxwell's equations to plane waves and skin effect. Poynting vector. Relation between field and circuit equations.

Lectures 3 hours a week, *first* term.

REFERENCES: Hayt, *Engineering Electromagnetics.*
Walsh, *Electromagnetic Theory.*
Fano, Chu and Adler, *Electromagnetic Fields, Energy and Forces.*

Professor Goldsmith

ENGINEERING 455. *Feedback Control Systems*

Open and closed loop control systems. Linear Systems. Mathematical techniques; classical methods, principle of superposition, the weighting function and convolution integral. Laplace transform methods, the transfer function. Steady state sinusoidal solution. Applications to first and second order systems. Transfer functions of components and systems. Feedback system analysis and design using frequency domain methods; steady state performance closed loop frequency response, stability analysis and compensation.

Lectures 3 hours a week, *first* term.
Problem analysis 3 hours alternate weeks, *first* term.

TEXT: Del Toro and Parker, *Principles of Control Systems Engineering.*

REFERENCE: Gille, Pelegrin and Decaulne, *Feedback Control Systems.*

Professor George

ENGINEERING 456. *Feedback Systems Laboratory*

Experimental determination of component characteristics: frequency response and impulse testing. Components: data sensing devices, motors and other power devices, amplifiers, modulators and demodulators. Design methods: interpretation of specifications, choice of motor or other power source, realization of compensating networks. Effects of common non-linearities: saturation dead zone and backlash. The analogue computer as a design tool. Laboratory design, construction and testing of a feedback control system.

Lectures 1 hour a week, *second* term.
Laboratory 3 hours a week, *second* term.

REFERENCES: Gibson and Tuteur, *Control System Components.*
Gille, Pelegrin and Decaulne, *Feedback Control Systems.*

Dr. Smith

ENGINEERING 458. *Electronics II*

Small signal parameters, measurement, use in design, circuit stability. Selective amplifiers, unilateralisation, automatic gain control. Modulation and modulating systems. High frequency oscillators, automatic frequency control, frequency changing, limiting and demodulation. Communication systems.

Lectures 2 hours a week, *first* term; 3 hours a week, *second* term.
Laboratory 3 hours a week, *first* term; 3 hours alternate weeks, *second* term.

REFERENCES: Schwartz, *Information Transmission, Modulation and Noise.*
Terman, *Electronic and Radio Engineering.*

Professor Gullen

ENGINEERING 462. *Electrical Machines*

Coupled circuit theory of rotating electric machinery is developed. Two-axis d-c machines, servomotors, synchros. Application to feedback systems. Kron's generalized theory of rotating electrical machinery is introduced using matrix algebra.

Lectures 2 hours a week, *first* term.

REFERENCES: Adkins, *The General Theory of Electrical Machines.*
Fitzgerald and Kingsley, *Electric Machinery.*

Professor Majmudar

ENGINEERING 463. *Advanced Electric Machines*

Coupled circuit theory of synchronous machines and induction machines. The major part of the course deals with the transient behaviour of round rotor and salient-pole synchronous machines. Transient and sub-transient reactances. Symmetrical and unsymmetrical short circuits. Electromechanical transients and stability of synchronous machines.

Lectures 2 hours a week, *second* term.
Laboratory 3 hours alternate weeks, *second* term.

REFERENCES: Lewis, *The Principles of Synchronous Machines.*
Concordia, *Synchronous Machines.*

ENGINEERING 464. *Electrical Power Systems*

Introduciton to applications of symmetrical components to power system analysis. Topics include: per unit representation of power system networks; transient and subtransient reactances of synchronous machines; symmetrical components; sequence impedances of synchronous machines, transmission lines and transformers; symmetrical and unsymmetrical faults on power systems; elements of power system stability.

Lectures 3 hours a week, *first* term.

REFERENCE: Stevenson, *Power System Analysis.*

Professor Majmudar

ENGINEERING 466. *Pulse and Switching Circuits*

Selected topics associated with the circuitry of pulse and data processing systems including the multivibrator and blocking oscillator, synchronization and frequency division, counters, pulse amplifiers, voltage and current time-base generators, switching circuits and gates. An introduction to Boolean algebra.

Lectures 3 hours a week, *second* term.

REFERENCES: Reich, *Functional Circuits and Oscillators.*
Caldwell, *Switching Circuits and Logical Design.*

Professor Gullen

ENGINEERING 471. *Metallurgy II*

Selection and use of metallic materials. Ferrous metals and alloys; non-ferrous metals and alloys. Unit operations in extractive metallurgy. Modern methods of fabrication, heat treatment and bonding. Corrosion, oxidation, and scaling of metals; means of protection. Metallic materials for high strength and high temperatures. Effects of radiation and high vacuum. Non-destructive testing.

Lectures 2 hours a week, *second* term.
Laboratory 3 hours alternate weeks, *second* term.

TEXT: Guy, *Elements of Physical Metallurgy.*

REFERENCES: Cottrell, *Theoretical Structural Metallurgy.*
Wulff, Taylor and Shaler, *Metallurgy for Engineers.*

Professor Putnaerglis

ENGINEERING 475. *Electrical and Magnetic Properties of Materials*

Investigation of dielectric, magnetic and conductive properties of materials from a microscopic point of view. Review of atomic physics, dielectric constants of solids, liquids and gases; ferroelectricity; spontaneous polarization; behaviour of dielectrics in alternating fields; dia-, para-, antiferro-, and ferri-magnetism; mechanism of conduction in metals and semiconductors; intrinsic, p-type, and n-type semiconductors; junction rectifiers and transistors; avalanche processes.

Lectures 2 hours a week, *second* term.
Laboratory 3 hours alternate weeks, *second* term.

REFERENCES: Dekker, *Electrical Engineering Materials.*
Von Hippel, *Dielectric Materials and Applications.*
Smit and Wijn, *Ferrites.*

ENGINEERING 492. *Summer Essay*

All students entering the fourth year of the engineering program must submit a summer essay. The summer essays are normally written on a topic drawn from the experience gained by the student during his summer employment.

Members of the Staff

ENGINEERING 495. *Engineering Seminar*

Seminars on engineering design, construction, production, research, economics, contracts, etc., arranged for fourth year students.

Guest Speakers

ENGINEERING 505. *Wing Theory*

Aerodynamic characteristics of wings at subsonic speeds: modified lifting-line and lifting-surface theories; Weissinger, Falkner and Multhopp methods; low aspect ratio wing theory. Supersonic wing theory: conical flow method; source distribution method with applications to rectangular, sweptback and triangular plan forms. (Half course.)

PREREQUISITE: Engineering 500 or equivalent.

Lectures 3 hours a week, *first* term.

REFERENCES: Robinson and Laurmann, *Wing Theory*.
Donovan and Lawrence, *Aerodynamic Components of Aircraft at High Speeds*.

Dr. Mandl

ENGINEERING 508. *Experimental Methods in Aeronautics*

Measurement errors, random and systematic errors, mean probable errors, method of least squares. Fundamental methods of measurement: displacement, velocity and acceleration in solid, fluid and gaseous systems. Measurement of temperature, pressure, density, density gradient, flow direction, Mach number, fluid surface friction and heat transfer. Measurement of forces and moments. Data recording. Principles and design of experimental test facilities including wind tunnels, shock tubes, hypervelocity ranges and structural equipment for static and dynamic testing. (Half course.)

Lectures 3 hours a week, *first* term.

REFERENCE: Landenburg, Lewis, Pease and Taylor, *Physical Measurements in Gas Dynamics and Combustion*.

Lecturer to be announced

ENGINEERING 512. *Dynamics of Flight*

Development of the general equations of motion of the airplane and its control systems. Small disturbance theory. Representation of aerodynamic effects by means of stability derivatives. Longitudinal and lateral stability criteria. Longitudinal and lateral modes of airplane motion. Transient motions of the airplane in response to control movement. Automatic stability and control. (Half course.)

PREREQUISITE: Engineering 437 or the equivalent.

Lectures 3 hours a week, *second* term.

REFERENCES: Etkin, *Dynamics of Flight*.
Kolk, *Modern Flight Dynamics*.

Dr. Gould

ENGINEERING 550. *Theory of Solid State Electronic Devices*

Structure and symmetry of solids. Types of crystal binding — ionic, covalent, molecular. Impurities, defects and dislocations. Energy band theory of solids — metals, insulators and semiconductors. Theory of conduction and the properties of minority carriers. Growth of crystals, methods of purification, the application of diffusion and alloy formation to the construction of devices. Theory of metal-semiconductor rectifiers, p-n junctions, junction transistors, tunnel diodes, avalanche phenomena and related devices (Zener diodes). Solid state detectors of light and nuclear radiations. Methods of making high frequency graded base transistors — drift transistors, mesas and epitaxials, micro-alloy diffused transistors. The theory of electric and magnetic polarization. Ferroelectric and ferromagnetic materials. Operation of "pumped" amplifiers — parametric amplifiers, masers and lasers.

Lectures 3 hours a week, *both* terms.

Dr. Simpson and Dr. Rolfe

ENGINEERING 552. *Network Analysis and Synthesis*

The first part of this course comprises a rigorous development of the properties of linear, lumped and time-invariant networks. The second part is devoted to passive network synthesis. Topics include: review of complex variables, Laplace transforms and network analysis, impulse function and response, representation of network functions, analytic properties of driving point and transfer functions. Synthesis of one-port with two kinds of elements, general passive one-ports, synthesis of lossless two-ports, insertion-loss synthesis, realization of RC two-ports and general passive two-ports, the approximation problem.

Lectures 3 hours a week, *both* terms.

REFERENCES: Seshu and Balabanian, *Linear Network Analysis*.
Balabanian, *Network Synthesis*.
Guillemin, *Synthesis of Passive Networks*.

Professor Majmudar

ENGINEERING 497. *Engineering Project*

As a part of the fourth year program, each student is required to select and complete a major project in engineering analysis, design, development, or research.   The objective is to provide an opportunity to develop initiative, self reliance, creative ability, and engineering judgment. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc.   Each student is expected to devote at least 200 hours to his engineering project.

Project work 4 hours a week, *first* term; 6 hours a week, *second* term.

Members of the Staff

GRADUATE STUDIES

The School of Engineering offers courses of graduate study leading to the Master of Engineering degree in the fields of Aeronautical Engineering and Electrical Engineering.   The regulations governing graduate studies are outlined on pp. 70-72 and pp. 76-78.

In addition to the graduate courses described below, courses may also be offered in the following areas: Fluid Dynamics and Thermodynamics of Turbomachines, Advanced Electromagnetic Theory, Switching Circuits, Computer Logic, and Rotating Electric Machines.

ENGINEERING 500. *Aerodynamics*

Derivation and application of the fundamental equations of nonviscous incompressible and compressible flow, significance and solution of two- and three-dimensional potential flow problems, low speed airfoil theories, wing lifting-line theory, two-dimensional isentropic flow, normal and oblique shock waves, supersonic nozzle contour design, supersonic nozzle and diffuser flow analysis, first- and second-order supersonic airfoil theory, small pertubation theory and similarity rules.   The lectures are supplemented by assigned problems.

PREREQUISITES: Engineering 330 and Mathematics 303 or permission of the instructor.

Lectures 3 hours a week, *both* terms.

REFERENCES: Liepmann and Roshko, *Elements of Gas Dynamics.*
Kuethe and Schetzer, *Foundations of Aerodynamics.*
Shapiro, *Dynamics and Thermodynamics of Compressible Fluid Flow.*
Sears, *General Theory of High Speed Aerodynamics.*

Professor Ruptash

ENGINEERING 501. *Theory of Viscous Flow*

Fundamental concepts of viscous flow; derivation of Navier-Stokes equations; Prandtl's boundary layer approximation; momentum integral methods; incompressible and compressible laminar and turbulent boundary layers; stability; transition; turbulent flow; flow separation; transformation methods; shock wave-boundary layer interaction; semi-empirical solution of turbulent skin friction and heat transfer problems.   (Half course.)

PREREQUISITE: Engineering 500 or equivalent.

Lectures 3 hours a week, *first* term.

REFERENCE: Schlichting, *Boundary Layer Theory.*

Mr. Rainbird

ENGINEERING 502. *Hypersonic Flow*

One dimensional unsteady compressible flow.   Hypersonic similarity; hypersonic small disturbance theory and applications; tangent-wedge and tangent-cone approximations; blunt body problems; heat transfer at hypersonic speeds; shock wave — boundary layer interactions; real gas effects; use of the Mollier diagram; dissociation, ionization and relaxation effects; frozen and equilibrium solutions for a real gas; experimental simulation of hypersonic flows. (Half course.)

PREREQUISITE: Engineering 500 or equivalent.

Lectures 3 hours a week, *second* term.

REFERENCES: Hayes and Probstein, *Hypersonic Flow Theory.*
Emmons, *Fundamentals of Gas Dynamics.*
Truitt, *Hypersonic Aerodynamics.*

Dr. Meyer

ENGINEERING 554a. *Introduction to Statistical Communication and Information Theory*

Elementary probability theory, joint and conditional probabilities; random variables and probability distributions, random processes; statistical averages, moments, characteristic functions, correlation and correlation functions; sampling and the central limit theorem; Fourier transforms; spectral analysis of random processes; the representation of linear systems and their response to random inputs; optimum linear systems; statistical detection of signals. Elementary concepts of quantitative information theory; the generation and transmission of information; representation of messages; the coding theorems and their consequences. (Half course).

Lectures 3 hours a week, *first* term.

REFERENCES: Davenport and Root, *An Introduction to Random Signals and Noise.*

Feller, *An Introduction to Probability Theory and its Applications.*

Fano, *Transmission of Information.*

Mr. Coll

ENGINEERING 554b. *Communication System Engineering*

Characterisation of information and signals, information content and system capacity; types of signals, discrete and continuous. Transmission of signals through linear networks, ideal transfer functions the time-bandwidth problem. Characterisation of transmission distortion in time-variant and -invariant systems; linear and non-linear distortion in amplitude, phase and delay. Modulation and modulation systems, sampling, coding and multiplexing; effect of transmission distortion on modulated signals. Characterisation of noise and interference, sources of noise, noise figures and noise temperatures. Susceptibility of various systems to noise and interference, exchange of bandwidth and signal to noise ratio, threshold. Comparative analysis of transmission systems in the presence of distortion and noise. Statistical methods for optimisation of transmission. Communication link design.

PREREQUISITE: Engineering 554a.

Lectures 3 hours a week, *second* term.

TEXT: Schwartz, *Information Transmission, Modulation and Noise.*

REFERENCE: Baghdady, *Lectures on Communication System Theory.*

Professor George

ENGINEERING 555a. *Advanced Feedback Control Theory*

Mathematical preliminaries; transform methods; stability based on Nyquist, Gain and Phase and Root-locus criteria; compensation; system synthesis, designing for stability and response criteria; optimization of linear systems. Classification of non-linear systems; phase plane analysis; describing function analysis for stability and response. (Half course).

Lectures 3 hours a week, *first* term.

REFERENCE: Seifert and Steeg, *Control Systems Engineering.*

Professor George

ENGINEERING 555b. *Sampled-data and Quantised Systems*

Sampling processes, spectra of sampled signals, sampling theorems, frequency-domain analysis, Z-transform analysis, transient response and system-error analysis, response to random inputs. Analogue to digital conversion. General design principles, root-locus method in the Z-plane. Adaptive controls. (Half course).

PREREQUISITES: Engineering 554a and 555a.

Lectures 3 hours a week, *second* term.

REFERENCES: Susskind, *Notes on Analogue-Digital Conversion Techniques.*
Seifert and Steeg, *Control Systems Engineering.*
Bendat, *Principles and Applications of Random Noise.*

Dr. Smith

ENGINEERING 556a. *Active Network Theory*

The general linear two port, parametric sets, the scattering and image parameters. **Matrix**
circuit analysis. Perturbed parameters, cascaded and conjoined quadripoles, active-element
pairs. Happ's Tables. Properties of the general active quadripole: driving point immittances,
asymptotic approximations; transfer properties, voltage, current and power gain; the stability
criteria of Llewellyn and Bahrs, Linvill charts. Effects of frequency on quadripole perform-
ance, Bode plots. (Half course).

Lectures 3 hours a week, *first* term.

TEXT: Cote and Oakes, *Linear Vacuum-Tube and Transistor Circuits.*

REFERENCES: Mason and Zimmerman, *Electronic Circuits, Signals, and Systems.*
Seshu and Balabanian, *Linear Network Analysis.*

Professor Gullen

ENGINEERING 556b. *Active Network Design*

Passive coupling networks, the interstage filter; narrow-band single and double-tuned selective
amplifier design, sensitivity to parameter variation, unilateralisation. The selection of coupling
networks. Feedback configurations, The Nyquist and inverse complex plane plots, Bode
plots, gain and phase margins. Wide band amplifier design. Contaminating signals and
noise, minimal noise circuits. Basic oscillator configurations, frequency stability. Students
will advance the discussion by presenting short papers on designated topics. (Half course).

PREREQUISITE: Engineering 556a.

Lectures 3 hours a week, *second* term.

TEXT: Cote and Oakes, *Linear Vacuum-Tube and Transistor Circuits.*

REFERENCE: Murphy, *Basic Automatic Control Theory.*

Professor Gullen

ENGINEERING 559. *High Voltage Technology*

Topics of discussion will include the problems associated with lightning and lightning protec-
tion with related impulse testing techniques; dielectric breakdown resulting from the
application of both power frequency and transient voltages; corona and radio interference
related to high voltage transmission lines. Secondary topics will include switching surges
and high voltage DC for both particle accelerators and power transmission. Visits will be
made to witness high voltage experiments and tests. (Half course).

Lectures 3 hours a week, *second* term.

ENGINEERING 560. *Digital Computer Applications in Engineering*

The course is intended to familiarize the candidate with the digital computer as a standard
tool in engineering analysis. The first part of the course deals with numerical methods and
includes such topics as the solution of simultaneous equations, ordinary differential equations
and partial differential equations. Some fifty per cent of course time will be devoted to
laboratory work using the IBM 1620 Computer. The candidate will be required to select
and solve problems in his area of specialization.

PREREQUISITE: Ability to program in 1620 SPS and FORTRAN.

Lectures and laboratory 3 hours a week, *second* term.

Professor Millar

ENGINEERING 562. *Electric Power System Engineering*

Electrical characteristics of transmission lines, transformers and machines, circuit representation
for analysis of power frequency behaviour, power flow and voltage analysis, unbalanced
system analysis, symmetrical components. Steady state and transient stability. The use of
analogue and digital computer techniques in stability analysis. Power system stability, means
of improving stability, surge phenomena, insulation design of power systems, and discussion of
problems in circuit breakers, relaying series capacitors, extra high voltage transmission, d.c.
transmission, application of probability methods to power system design and economic power
system operation.

Lectures 3 hours a week, *both* terms.

Professor Goldsmith

ENGLISH LANGUAGE AND LITERATURE

Professor; Chairman of the Department, 1962-63 . Munro Beattie, A.M., Ph.D.
Professors . . . . G. B. Johnston, M.A.
R. L. McDougall, M.A., Ph.D.
Associate Professor . . . . G. J. Wood, M.A.
Assistant Professors . . . . Michael Hornyansky, M.A.
Benjamin Jones, A.M., Ph.D.
Lorna Young, M.A., Ph.D.
Lecturers . . . . Thomas Jemielity, M.A.
Maureen Hanna, B.A., B.Litt.
Dolores Bedingfield, M.A.
Sessional Lecturer . . . . Douglas Wurtele, B.A.
Instructors . Ruth M. Underhill, M.A., Gretl Fischer, M.A., Jean Collins, M.A.,
Edwina Carson, B.A., Dorothy Judge, B.A., Andrey Strutt, B.A., Audrey Vernon,
B.A., J. Marie Hicks, B.A., R. Joy Murray, B.A.

The objectives for students who elect English as their major or honours subject are as follows:

1. to become acquainted with the chief works of the principal authors;
2. to understand the main developments in language, ideas, and genre;
3. to acquire standards of literary judgment, appreciation, and expression.

MAJOR IN ENGLISH: Every student who elects English as his major subject will plan his program in conference with a representative of the department. The required courses in English are as follows:

in the First year, English 165;

in the Second year, English 200 and English 265;

in the Third year, English 365; and two or three additional courses in English, to be taken in the Second and Third years.

A comprehensive examination will be written in the final year.

HONOURS IN ENGLISH: An honours student will plan his program in conference with the chairman of the department. The curriculum for honours in English comprises a number of courses which are restricted to honours students, besides those which are taken with major students. The following courses will be obligatory: English 165, 200, 265 and 365 with the major students, English 270, 375 and 290 as courses restricted to honours students. Five additional courses in English will be required, four of which must be honours courses. At least six courses in other subjects should be taken, which should include history, philosophy, and a language other than English; in any subject selected, more than one course should be taken.

Provision may be made in the final year for independent study in a field of concentration of the student's own choice, such as the following: the novel, comparative literature, criticism, Old and Middle English, Canadian history and culture. A graduating essay will be presented on the approved topic, upon which the student will be examined orally.

At the end of the final year the candidate for an honours degree in English language and literature must show satisfactory performance in a written comprehensive examination. A list of the authors and texts in which he is to be examined may be obtained from the chairman of the department.

Combined honours courses may be taken in English and German, and English and French, English and History, English and Philosophy.

(For information regarding preparation for admission to the Ontario College of Education for the Interim High School Assistant's Certificate, Type A, students are invited to consult the Registrar. Students who look forward to high-school teaching as a career are urged to consider the advisability of taking an honours degree.)

N.B.   Prospective students should obtain a summer reading list from the departmental office.

ENGLISH 10. [120].   *Literature and Composition*

The course comprises two parts: (a) the study of selected plays, poems, short stories, essays, and a novel; (b) a systematic study of the art of writing English prose. Neither part may be taken separately, unless, in rare cases, with the permission of the department. A student whose attendance and work are irregular in either part of the course may be denied permission to write the final examination.

> *Day Division*:   Annually (classes three hours a week, practice period one or more hours a week).

> Mr. Jemielity, Miss Hanna, Mrs. Bedingfield, Mrs. Underhill

> *Evening Division*:   1962-63 (classes four hours a week).

> Professor Young

ENGLISH 100. [210].   *English Authorst from Chaucer to T. S. Eliot*

A study of selected masterpieces in English literature from the fourteenth to the twentieth century—a course for students who do not elect English as a major subject. Essay-writing and regular participation in discussion groups are required.

TEXTS:

C. W. Dunn (ed.), A Chaucer Reader; Shakespeare, Antony and Cleopatra; Milton, Paradise Lost; Swift, Gulliver's Travels; Pope, Selected Poems (Rinehart); Austen, Emma; Wordsworth, The Prelude and Selected Poems (Rinehart); Dickens, Great Expectations; Twain, Huckleberry Finn; Shaw, Major Barbara; T. S. Eliot, Selected Poems (Faber); Leacock, Sunshine Sketches of a Little Town; E. J. Pratt, Ten Selected Poems.

PREREQUISITE: English 10 or equivalent.

> *Day Division*:   Annually (lectures three hours a week, group discussion one hour a week).

> Professors Hornyansky and Jones, and assistants

> *Evening Division*:   1962-63 (lectures two hours a week, discussion group one hour a week).

> Professor Johnston and assistants

> *Summer* 1962 (lectures five hours a week).

> Mr. Wurtele

ENGLISH 115. [230].

A study of selected examples of literary genres from classical antiquity to the twentieth century. Open to students reading for an Engineering degree. This course may serve, at the discretion of the English department, as a prerequisite to advanced courses in English.

> *Day Division*:   Lectures two hours a week, discussion group one hour a week.

> Mrs. Bedingfield

ENGLISH 165. [221].   *Mediaeval and Renaissance English Literature*

Authors studied will include Chaucer, Malory, Spenser, Marlowe, Shakespeare, Jonson, Webster, Donne, Milton and Bunyan.

> *Day Division*:   Annually (lectures three hours a week, group discussion one hour a week).

For English Honours and Major students.

> Professor Wood and members of the department

ENGLISH 200. [300]. *Studies in Language and Literary Forms*

A variety of texts will be read, with a view to an understanding of critical procedures and principles. Considerable attention will be given to language, prosody, bibliography, genres and methods of analysis.

PREREQUISITE: English 165, or permission.

Day Division: Annually (lectures three hours a week).

Professors Beattie, Johnston, and Young

ENGLISH 205. [365]. *Writing Seminar*

A non-credit seminar in writing, involving regular assignments in various genres, and practical criticism based on this work. Whether the course is offered in a given year, and whether it concentrates on prose or verse, will depend upon the enrolment.

PREREQUISITE: Permission of the instructor. Apply in early October. Freshmen will not normally be admitted.

Day and Evening Division: Seminar one hour a week.

Professor Hornyansky

ENGLISH 220. [320]. *Chaucer, Spenser, and Milton*

TEXTS: F. N. Robinson (ed.), *Chaucer's Complete Works*
Smith and De Selincourt (ed.), *The Poetical Works of Edmund Spenser*
Hughes (ed), *John Milton, Complete Poems and Major Prose.*

Not offered, 1962-63.

ENGLISH 225. [325]. *English Drama to 1642 (with emphasis on Shakespeare)*

A study of the mediaeval origins of English drama; miracle and morality plays; the drama and stage of the English Renaissance, to the closing of the theatres in 1642.

Not offered, 1962-63.

ENGLISH 227. [327]. *Seventeenth Century Literature*

Not offered, 1962-63.

ENGLISH 230. [330]. *Restoration and Eighteenth Century Literature*

The poetry and prose of English neoclassicism, focusing on the work of Dryden, Pope, Swift, and Johnson; including the development of prose style, and the shift from classic to romantic.

PREREQUISITE: English 100 or 165.

Evening Division: 1962-63 (lectures two hours a week).

Mr. Jemielity

ENGLISH 265. [321]. *Restoration, Eighteenth Century, and Romantic Literature*

Survey, for major and Honour students, of the period from Dryden to Keats.

PREREQUISITE: English 165 or permission of department.

Day Division: Annually (lecturers three hours a week).

Professor Jones

ENGLISH 270. [310]. *Old English*

A study of Old English language and literature including grammar and phonology, and translation of selections of Old English prose and poetry.

TEXTS: *Sweet's Anglo-Saxon Primer.* Ninth Edition, rev. Davis; and selected texts.

Day and Evening Division: (lectures three hours a week).

PREREQUISITE: For honours students.

Professor Johnston

ENGLISH 272. [317]. *Chaucer*

Not offered, 1962-63.

ENGLISH 274. [322]. *Spenser and Milton*

Not offered, 1962-63.

ENGLISH 277. [323]. *Renaissance Prose and Poetry*

An intensive examination of the origins and development of the English Renaissance. (1500 - 1660)

TEXTS: To be announced.

PREREQUISITE: English 165 or equivalent.

Day Division: lectures three hours a week.

Professor Wood

ENGLISH 278. [324]. *Drama in England until 1642*

Study of the development of dramatic production and literature from the middle ages to the closing of the theatres in 1642.   Reading of representative plays.

Not offered, 1962-63.

ENGLISH 283. [328]. *Shakespeare and Milton*

Not offered, 1962-63.

ENGLISH 290. [360]. *Literary Criticism from Aristotle to the Present*

TEXT: W. J. Bate, *Criticism: the Major Texts.*

PREREQUISITE: Honours students; others by permission of the Department.

Day Division: (lectures three hours a week).

Professor McDougall

ENGLISH 325. [306]. *English Drama*

The development of the drama in England from its mediaeval beginnings to the present day. Some examination of relevant classical and continental theatre will be included.

PREREQUISITE: English 110 or 165 or permission of the instructor.

Day and Evening Divisions: 1962-63   (lectures two hours a week).

Professor Wood

ENGLISH 340. *Nineteenth Century Literature*

The major Romantic and Victorian poets from Wordsworth to Swinburne. Contemporary prose by Wordsworth, Coleridge, Carlyle, Newman, Mill, Arnold, Butler.

PREREQUISITE: English 165 or 100.

Summer 1962: lectures ten hours a week.

Professor Jones

Day Division: 1962-63   (lectures two hours a week).

Professor Hornyansky

ENGLISH 348*. *Canadian Poetry*

Selected readings from **Canadian Anthology** (eds. Klinck and Watters) and **Poets of the Confederation** (ed. Ross), with special attention given to the poetry of Lampman, D. C. Scott, Pratt, and Klein.   Supplementary readings from **L'Ame de la poésie canadienne-française** (ed. Rièse).   (Half course).

PREREQUISITE: English 100 or 165.

Day Division: 1962-63 (lectures two hours a week, *first* term).

Professor McDougall

ENGLISH 349*. *The Canadian Novel*

Selected readings from **Canadian Anthology** (eds. Klinck and Watters), and the following texts: Haliburton, **The Clockmaker;** Duncan, **The Imperialist;** Grove, **The Master of the Mill;** Callaghan, **More Joy in Heaven;** Maclennan, **Barometer Rising;** Ethel Wilson, **The Equations of love;** Ross, **As For Me and My House;** Raddall, **His Majesty's Yankees;** Davies, **Leaven of Malice;** Leacock, **Arcadian Adventures;** Ringuet, **Trente arpents;** Gabrielle Roy, **Bonheur d'occasion.**   (Half course).

PREREQUISITE: English 100 or 165.

Day Division: 1962-63 (lectures two hours a week, *second* term).

Professor McDougall

ENGLISH 345. *Major Twentieth-Century Authors*

A survey of themes, forms, and literary relationships since 1885.

PREREQUISITE: English 100, 165, or permission.

Day Division: 1962-63   (lectures three hours a week).

Professors Young and Beattie

ENGLISH 352. *Contemporary Texts*

A detailed and analytic study of several difficult twentieth-century works, notably T. S. Eliot, Four Quartets, and poems by W. B. Yeats, W. H. Auden and Dylan Thomas.

PREREQUISITES: Permission of the instructor.

Day and Evening Division: (seminar two hours a week).

Professor Beattie

ENGLISH 365. [421]. *Victorian and Twentieth-century Literature*

Survey for major and honours students of the period from Tennyson to the present, including American authors.

Not offered, 1962-63.

ENGLISH 370. [315]. *Middle English*

A study of the English language and literature between the Norman Conquest and the fifteenth century. Special attention is given to fourteenth-century literature exclusive of Chaucer. Dickins and Wilson, Early Middle English Texts; Sisam, Fourteenth Century Verse and Prose; Sir Gawain and the Green Knight, ed. Tolkien and Gordon; Piers Plowman, *Passus* I-VII, ed. Skeat.

PREREQUISITE: For honours students.

Day and Evening Divisions: (lectures three hours a week).

Miss Hanna

ENGLISH 375. [326]. *Life and Works of Shakespeare*

Intensive study of Shakespeare's environment and development as a dramatist, with careful reading of certain plays.

Not offered, 1962-63.

ENGLISH 380. [342]. *Nineteenth Century Thought*

Readings in the Romantic and Victorian periods, emphasizing ideas on culture, society, and the uses of literature; Coleridge, Carlyle, Ruskin, Newman, Mill, and Arnold receive special attention.

PREREQUISITE: For honours students; others by permission of the instructor.

Not offered, 1962-63.

ENGLISH 385*. [332]. *Restoration and Eighteenth Century Drama*

PREREQUISITE: For honours students. (Half course).

Offered as a summer reading course.

Professor Jones

ENGLISH 410. [312]. *Old English Poetry*

Translation and study of the text of Beowulf and the Finnsburg Fragment.

TEXT: *Beowulf and the Fight at Finnsburg*, ed. Klaeber. Third edition.

Not offered, 1962-63.

ENGLISH 446. [346]. *American Literature*

Not offered, 1962-63.

ENGLISH 480. [355]. *The English Novel*

The development of the art of fiction in English literature, from its beginnings in the eighteenth century, through the major Victorian novelists, to the chief authors of the twentieth century.

PREREQUISITE: English 100 or 165.

Evening Division: 1962-63 (lectures two hours a week).

Professor Beattie

GRADUATE COURSES

The Department of English will, where it is possible, provide programs of studies leading to the degree of Master of Arts in English Language and Literature. Such programs will be planned with regard both to each candidate's special requirements and to the library facilities available. (See also pp. 76-78).

A candidate for the M.A. degree must have completed the requirements of an Honours B.A. degree in English Language and Literature or have similar qualifications. By departmental permission, certain of these requirements may be completed after the candidate has been admitted as a graduate student.

At least four months before he comes up for the degree, the candidate must pass a comprehensive examination in English Literature. Ordinarily this examination will be available in January of each year.

The student must obtain at least B standing in each of three graduate courses and must pass an oral examination on his thesis.

Several courses may be offered each year from among those listed below. For details, consult the chairman of the English department.

COURSES OF STUDY

ENGLISH 511. *Beowulf*

ENGLISH 516. *Poetry in the Fourteenth Century*

ENGLISH 521. *Donne and Browne*

ENGLISH 524. *Elizabethan and Jacobean Drama*

ENGLISH 526. *Shakespeare*

ENGLISH 527. *Milton*

ENGLISH 530. *Eighteenth Century Poetry*

ENGLISH 535. *Eighteenth Century Prose*

ENGLISH 539. *The Romantic Movement*

ENGLISH 546. *Tennyson and Browning*

ENGLISH 551. *British and American Poetry Since 1900*

ENGLISH 558. *Major American Authors of the Nineteenth Century*

ENGLISH 560. *Henry James and the Modern Novel*

(See also the announcement of the Institute of Canadian Studies, p. 79).

FINE ARTS

Sessional Lecturer (Art)	J. K. B. Robertson, M.A.
Sessional Lecturers (Music)	Carman H. Milligan, Mus.Bac., M.Mus.
	Gerald Wheeler, F.R.C.O.

Courses in the history of fine arts have been offered by Carleton University in co-operation with the National Gallery of Canada. The collections and study materials of the National Gallery afford the student unusual opportunities for direct observation.

The sequence of courses for academic credit is temporarily suspended.

Enquiries may be addressed to the Dean.

FRENCH

Associate Professor; Chairman of the Department, 1962-63

C. P. Fleischauer, A.M., Ph.D.

Associate Professor	J. S. Tassie, M.A., Ph.D.
Assistant Professor	Manfred Bambeck, Dr.phil.
Visiting Professor	Pierre Mélèse, D.ès L.
Lecturers	Eva Kushner, M.A., Ph.D.
	Paulette F. J. Collet, Dip.Ed., M.A.
Sessional Lecturers	G. S. DuVernet, M.A.
	Madeleine Mélèse, L. ès Sc.
	Wm. Fraser, B.A.

As Carleton University is situated in a bilingual community, students are encouraged to take advantage of the multiple opportunities for practical appreciation of the language. Radio, television, cinema, stage, the press, and everyday conversation are at hand to supplement academic course work. Class lectures are conducted in French as far as is feasible. The Department also has at its disposal a fully equipped language laboratory.

PASS COURSE

A student wishing to major in French must have 'C' standing or better in French 100. He should consult the Department *no later than the end of the First year* to plan his program with care in order to prepare for a comprehensive examination at the end of the final year.

HONOURS COURSE

Several honours programs are available. Course patterns are designed to assure a balanced appreciation of all periods of French literature, with competence in oral and written expression in the French language. Interested candidates will note the general regulations governing honours on pp. 73-75. The Department requires in addition that candidates do summer reading, include practical work in the laboratory in *each* year of the program, and sit for a comprehensive examination at the end of the final year.

Combined honours programs are available in *French and German* (see also p. 138) and *English and French* (see also p. 118). They are intended to prepare the student for the Ontario College of Education courses leading to the Interim High School Assistant's Certificate, Type A, and must be planned in close consultation with the departments concerned. General information on O.C.E. requirements may be obtained from the Registrar.

Honours in French. This program is designed for students intending to pursue graduate studies in the field of Romance languages. It normally consists of twenty courses after Grade 13, and will include the study of a second language other than English each year.

In the First Year the following courses will be chosen:

> English 100;
> Philosophy 100;
> History 115;
> French 100;
> a course in German (or Spanish or Russian or Latin[1]);
> a First year course in science or mathematics[2].

Senior courses will include:

> 8 or more additional course credits in French;
> 3 or more additional course credits in German (or Spanish or Russian or Latin);
> a further course (or courses) in: English, History, Philosophy, Classics, or Psychology.

GRADUATE STUDIES

The Department will consider applications for study leading to the M.A. degree in fields for which facilities are at hand. The courses listed in the 500 series are currently available; the student may be directed, however, to select certain of these in combination with others, e.g., French 470 or French 480. Attention is also drawn to the general regulations found on pp. 76-78.

Courses Offered: 1962-63:

> *Day only*: 201, 210, 220, 470
> *Evening*: 301, 346*, 520, 540
> *Day and Evening*: 10, 100

FRENCH 10. [100].   *Readings in Modern French*

The novel and short story by authors if the nineteenth and twentieth centuries.   Grammar, translation, oral practice.

TEXTS: Sonet and Shortliffe, *Standard French* (Harcourt Brace)
Salvan, *Images de l'homme* (Harcourt Brace)
J. Romains, *Knock* (Livre de poche).

Day Division: Annually (lectures three hours a week).

Evening Division: Annually (two lectures a week).

Members of the Department

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[1]Latin 10 must be taken before graduation.
[2]Students are expected to take a science course before graduation. This requirement of the First year may be fulfilled in the Second year.

FRENCH 100. [220]. *French Literature and Culture*

Brief but inclusive review of the development of French literature, with emphasis on reading and study of representative literary works of all types. Composition and oral practice for students intending to major in French.

TEXTS: Sonet and Shortliffe, *Standard French* (Harcourt Brace)
Schinz, *Nouvelle Anthologie française* (Harcourt Brace)
Graham, *Representative French Poetry*.

REFERENCE TEXTS: Brereton, *A short history of French Literature* (Pelican).
Mason, *A concise survey of French Literature* (Barker).

PREREQUISITE: French 10.

Day Division: Annually (lectures three hours a week; practice sessions to be arranged).

Evening Division: Annually (two lectures a week).

Summer 1962 (two lectures a week).   Members of the Department

FRENCH 201*. [301]. *Le français oral*

Phonétique et conversation; travaux de laboratoire.

TEXTS: *Petit Larousse illustré*
Gregg, *A Student's Manual of French pronunciation* (Macmillan)

PREREQUISITE: French 100.

Day Division: 1962-63 (two hours a week throughout the year).
Mme Mélèse and Mr. Fraser

FRENCH 202*. [302]. *Conversation et traduction*

Cours de conversation avancée; l'art de la traduction; travaux de laboratoire.

TEXTS: *Petit Larousse illustré*
Whitmarsh, *Complete French Course* (Longmans Green)
Picard et Black, *Manuel de conversation française* (Heath)

PREREQUISITE: French 201* or permission of the Department.

Not offered, 1962-63.

FRENCH 210. [310]. *La littérature et la pensée françaises du 17e siècle*

La première génération des grands classiques; la deuxième génération. La querelle des Anciens et des Modernes.

TEXTS: Lagarde et Michard, *XVIIe Siècle* (Bordas)
Corneille, *Polyeucte*
Racine, *Britannicus*
Molière, *Les Femmes Savantes*

REFERENCE TEXT: Lanson et Tuffrau, *Manuel d'histoire de la littérature française* (Heath)

PREREQUISITE: French 100.

Day Division: 1962-63 (three lectures a week).
Professor Mélèse

FRENCH 215. [315]. *La littérature et la pensée françaises du 18e siècle*

Prolongement du classicisme. Les nouvelles idées politiques, sociales, religieuses, philosophiques.

TEXTS: Fellows and Torrey, *The age of Enlightenment* (Crofts)

PREREQUISITE: French 100.

Not offered, 1962-63.

FRENCH 220. [317[. *La littérature et la pensée françaises du 19e siècle*
Romantisme, réalisme et symbolisme. Le roman, le théâtre, la poésie.
TEXTS: Lagarde et Michard, *XIXe Siècle* (Bordas)
Castex et Surer, *XIXe Siècle* (Hachette)
Guthrie and Diller, *French Literature and Thought since the Revolution*
Choix de pièces de théâtre et de romans
PREREQUISITE: French 100.
Day Division: 1962-63 (three lectures a week).

Mrs. Kushner

FRENCH 225. [320]. *Littérature française contemporaine*
Du symbolisme et du naturalisme à nos jours. Etude détaillée d'un choix d'oeuvres parmi les
grands écrivains représentatifs d'aujourd'hui.
TEXTS: Gendrot et Eustache, *Auteurs français du 20e siècle*
Simon, *Histoire de la littérature française au 20e siècle*
G. Lanson, *Histoire de la littérature française*
PREREQUISITE: French 210 or 215 or 220.
Not offered, 1962-63.

FRENCH 301*. [303]. *Stylistique*
Problèmes de traduction et de syntaxe; analyse des procédés stylistiques.
TEXTS: *Petit Larousse illustré*
Ireson, *A Manual of French Prose Composition* (Harrap)
Marouzeau, *Précis de stylistique française*
PREREQUISITE: French 202 or permission of the Department.
Evening Division: 1962-63 (one lecture a week).

Mme Mélèse

FRENCH 302*. [304]. *Explication de texte*
Examen détaillé d'un petit nombre de chefs-d'oeuvre littéraires pour développer l'art de
l'explication de texte.
TEXTS: Montaigne, *Essais*
Rousseau, *Rêveries d'un promeneur solitaire*
Valéry, *Charmes*
PREREQUISITE: French 210, 202, or permission of the Department.
Not offered, 1962-63.

FRENCH 330. *Littérature canadienne de langue française*
Le roman et la poésie; le folklore, la presse. Etude de la littérature canadienne faite à
la lumière des mouvements tant français qu'américains.
TEXTS: Laure Rièse, *L'Ame de la poésie canadienne française*
Choix des romans importants depuis *Les Anciens Canadiens*
REFERENCE TEXT: Tougas, *Histoire de la littérature canadienne-française*
PREREQUISITE: French 210 or 220 or permission of the Department.
Not offered, 1962-63.

FRENCH 345*. *Histoire de la littérature française*
TEXTS: Castex et Surer, *Manuel des études littéraires françaises*
G. Lanson, *Histoire de la littérature française*
PREREQUISITE: French 210 or 215 or permission of the department.
Not offered, 1962-63.

FRENCH 346*. *Histoire de la civilisation française*
    TEXTS: Seignobos, *Histoire sincère de la nation française*
                Blancpain et Clarac, *La France d'aujourd'hui* (Hatier)
    PREREQUISITE: French 210 or 215 or permission of the department.
    Evening Division: 1962-63 (one lecture per week).
                                                   Mme Mélèse

FRENCH 405. *L'ancien français*
Les origines de la langue; étude de la littérature du Moyen Age.
    TEXTS: Pope, *From Latin to modern French*
                Bartsch, *Chrestomathie de l'ancien français*
    PREREQUISITE: French 210 and Latin 10.
    Not offered, 1962-63.

FRENCH 410. *La littérature de la Renaissance*
Début de l'ère moderne: l'humanisme; les innovations littéraires du 16e siècle. Etude particulière de Rabelais, Montaigne, et la Pléiade.
    TEXTS: G. Lanson, *Histoire de la littérature française*
                Lagarde et Michard, *XVIe Siècle* (Bordas)
                Classiques Larousse: Marot, Ronsard, Du Bellay, Montaigne, Rabelais
    PREREQUISITE: French 210.
    Not offered, 1962-63.

FRENCH 440. [360]. *Le roman français*
Le développement du roman français depuis son inauguration jusqu'à nos jours. Les auteurs à étudier seront choisis dans la liste suivante: Honoré d'Urfé, Mme de La Fayette, Scarron, Lesage, Bernardin de Saint-Pierre, Rousseau, Voltaire, Balzac, Chateaubriand, Constant, Flaubert, Mérimée, Sand, Stendhal, Zola, Saint-Exupéry, Mauriac.
    REFERENCE TEXT: Lanson et Tuffrau, *Manuel d'histoire de la littérature française* (Heath)
    PREREQUISITE: French 210 or 215 or permission of the department.
    Not offered, 1962-63.

FRENCH 470. *Seminar on a topic of French literature*
Examination of a particular theme or area in French studies by directed readings and papers. Intended primarily for honours and graduate students.
    Day Division: 1962-63 *Molière* (two hours per week).
                                     Professor Mélèse

FRENCH 480. *Tutorial*
Directed study, including essays, designed to fill special needs of individual students at the senior undergraduate or graduate level.

FRENCH 505. *Introduction to Romance philology*
A course designed to show the historical development of the French language and its relations with the other Romance languages.

FRENCH 520. *Le roman canadien de langue française*
Etude détaillée de quelques-uns des romanciers les plus importants du Canada français. Ce cours forme le complément du cours suivant (French 521) et du cours, "The Canadian Novel". (See p. 74.)
                                     Professor Tassie

FRENCH 521. *La poésie canadienne de langue française*
Examen sérieux de l'oeuvre de quelques poètes parmi les plus importants du Canada français. Ce cours forme le complément naturel du cours précédent (French 520) et du cours "Canadian Poetry". (See p. 74.)

FRENCH 540. *Penseurs et réformateurs du 18e siècle français*
Montesquieu et le relativisme, les idées de Voltaire sur la tolérance et la liberté, Diderot et le matérialisme, Rousseau théoricien de la politique et de la pédagogie.
                                  Professor Fleischauer

GEOGRAPHY

Associate Professor; Chairman of the Department, 1962-63 . . G. C. Merrill,
M.A., Ph.D.

Assistant Professor . . . . J. Peter Johnson, Jr., A.M.
Sessional Lecturers . . . . Robert M. Bone, M.A.
J. Keith Fraser, M.A.

PASS COURSE

Students majoring in Geography in the Pass Course are required to complete six
courses in Geography. One of these courses must be Earth Science 100, taken in the
First year, with a grade of 'C' or better. The entire program must be approved by
the Chairman of the Department.

EARTH SCIENCE 100. [200].

The evolution of the continents; rocks and minerals; mountain building and deformation;
the cycle and agents of erosion; climatology; oceanography; the genetic study of land forms.

TEXTBOOK: Arthur Strahler, *Physical Geography*
Leet and Leet, *The World of Geology*
Supplementary reading to be announced.

Day Division: 1962-63 (lectures two hours a week, laboratory two hours
a week, two field excursions).
Professor Johnson

GEOGRAPHY 112*. [212]. *Physical Geography*

Climatology; oceanography; the genetic study of land forms. (Half course).

REFERENCE TEXT: Arthur Strahler, *Physical Geography*.

Day Division: 1962-63 (lectures two hours a week, laboratory two hours
a week, two field excursions, *second* term).
Professor Johnson

GEOGRAPHY 210. [310]. *Principles of Geomorphology*

A systematic study of the origin and evolution of relief features of the earth. The application
of existing concepts and methods of investigation to problems in interpretation will be
emphasized, and geomorphic processes active in northern areas will be studied in detail.

TEXT: Thornbury, *Principles of Geomorphology*.
Miller, *Photogeology*.

REFERENCE TEXT: Flint, *Glacial and Pleistocene Geology*.

PREREQUISITE: Earth Science 100 or Geology 110.

Day Division: 1962-63 (lectures two hours a week, laboratory two hours
a week, two field excursions).
Professor Johnson

GEOGRAPHY 235. [335]. *Historical Geography*

A study is made of the relation of man, habitat, and economy of past eras. The role of
man as an ecologic dominant is stressed. The geographic setting of the past is re-
constructed for a number of societies.

REFERENCE TEXTS: Ralph E. Brown, *Historical Geography of the United States*.
C. L. and E. H. Lord, *Historical Atlas of the United States*.

PREREQUISITES: Earth Science 100, Geography 112, or permission of the
instructor.

Day Division: 1962-63 (lectures and discussion, three hours a week).
Professor Merrill

GEOGRAPHY 315. *North America*

This course outlines the physical, historical, and economic geography of North America as a whole. Principal regions of the continent are dealt with in detail.

TEXT: J. H. Paterson, *North America.*

REFERENCE TEXTS: Alfred J. Wright, *United States and Canada*, 2nd edition.
Miller, Parkins, and Hudgins, *Geography of North America*, 3rd edition.

PREREQUISITE: Earth Science 100, or Geography 112.

Day Division: 1962-63 (lectures and discussion three hours a week).

Professor Merrill

GEOGRAPHY 320. *Geography of the Humid Tropics*

A comprehensive regional study of the humid tropical environment with special emphasis upon Latin America and the Caribbean. Indigenous economies; development of plantations; agricultural and industrial potentials.

REFERENCE TEXT: Pierre Gourou, *The Tropical World.*

PREREQUISITE: Earth Science 100 or Geography 112.

Not offered, 1962-63.

GEOGRAPHY 325. *Cartography*

The study and construction of the major map projections; the fundamentals of lettering and map layout; the construction of special purpose maps, such as land use, population, production, etc.

TEXT: Robinson, *Elements of Cartography*, 2nd edition.

PREREQUISITE: Permission of the instructor.

Day Division: 1962-63 (lecture one hour a week, laboratory four hours a week).

Professor Merrill

GEOGRAPHY 360. *Soviet Union*

This course deals with the physical and economic geography of the U.S.S.R. Study is made of the climate, vegetation, and soils, with an emphasis upon the regional pattern of economic activity.

TEXT: M. Baransky: *Economic Geography of the U.S.S.R.*

PREREQUISITE: Earth Science 100, or Geography 112, or permission of the Department.

Evening Division: 1962-63 (lectures two hours a week).

Mr. Bone

GEOGRAPHY 430. *Geography of the Northern Lands*

A study of arctic and sub-arctic regions. The physical geography, exploration, and development of northern areas will be considered, and the resource potential and problems of settlement examined.

REFERENCE TEXTS: To be announced.

PREREQUISITE: Earth Science 100, or Geography 112, or permission of the Department.

Evening Division: 1962-63 (lectures two hours a week).

Mr. Fraser

GEOGRAPHY 450. *Europe*

The physical and cultural regions of Europe will be examined in detail. Emphasis will be placed upon the pattern of economic activity within the continent.

REFERENCE TEXT: A. G. Ogilvie, *Europe and Its Borderlands.*

PREREQUISITES: Earth Science 100, Geography 112, or permission of the Department.

Not offered, 1962-63.

GEOLOGY

Associate Professor; Chairman of the Department, 1962-63
                                                    F. K. North, M.A., D.Phil.
Associate Professors . . . . W. L. Young, M.Sc., Ph.D.
                                                    (on leave of absence, 1962-63)
                                                    P. A. Hill, B.Sc., F.G.S., F.P.S., F.R.G.S.
Assistant Professors . . . . K. Hooper, M.Sc., F.G.S.
                                                    J. M. Moore, B.Sc., Ph.D.
                                                    W. M. Tupper, M.Sc., Ph.D.
Special Lecturer . . . . . F. J. Alcock, Ph.D., F.R.S.C., F.G.S.A.
Chief Demonstrator . . . . Marjorie Allen, M.Sc.
Sessional Lecturers . . . . R. L. Borden, M.Sc., P.Eng.,
    R. W. Boyle, Ph.D., F.R.S.C., L. S. Collett, B.Sc., M.A., L. A. Donaldson, B.Sc.,
    Ph.D., F.G.A.C., E. R. Niblett, M.Sc., Ph.D.
Honorary Research Professor . J. E. Riddell, B.Eng., M.Sc., Ph.D., F.R.S.C.
Post-Doctoral Research Fellow . . . . . G. Y. Chao, M.Sc., Ph.D.
Assistant Curator . . . . M. C. Jagoe

DEPARTMENT OF GEOLOGY

The proximity of Carleton University to libraries, research offices, and labora-
tories of the Geological Survey of Canada, the Dominion Observatory, the Mines
Branch, and the National Research Council, enables undergraduate and graduate
students in the Geological Sciences to make contact with leading workers in Geology,
Geochemistry, and Geophysics. Lectures by visiting scientists and meetings of
various technical groups are open to students of the University.

PASS COURSE

Students intending to major in Geology must satisfy the requirements of the
Qualifying University and First years of the general B.Sc. program. Geology
100 may be taken in the Qualifying or First year. The normal pattern of courses is
Geology 100, plus all 200 and 300 series courses.

Minor subjects should be Chemistry, Mathematics, Physics, or one of the
Biological Sciences. The following subjects are required: Mathematics 130 or 100,
Chemistry 100, Physics 100, and Biology 20. Mathematics 130 may be taken only by
students electing to minor in the Biological Sciences.

Students who intend to enter the Mineral Industry as professional geologists.
should take additional subjects in the 400 series as recommended by the Department

HONOURS COURSE

Honours requirements are:

1) At least ten courses in Geology, of which eight are mandatory and two may be
    selected from the "Hard or Soft Rock" options. Additional courses which are
    appropriate for students selecting either option are designated as "Special" options
    and may be taken on the recommendation of the Department.
    Mandatory courses — Geology 100, 211, 220, 330, 350, 360, 272, Geography 210,
    Geology 412, 420, 491.
    "Soft Rock" option — Geology 424, 431, 462, 463.
    "Hard Rock" option — Geology 422, 451, 464, 480.
    "Special" options — Geology 425, 471, 481, 482.

2) Mathematics 100 and at least one advanced course in Mathematics.

3) A total of six or seven courses in the Physical or Natural sciences other than Geology, of which it is desirable to have four in one field.
4) Three non-Science, non-Mathematics courses, including one language other than English.
5) A comprehensive oral examination at the end of the Fourth year.
6) Selection of the Honours pattern can be made only after consultation with the Department.

GRADUATE STUDIES

The Department offers instruction leading to the degree of Master of Science. Candidates will be required to:

(a) comply with the general regulations of the School of Graduate Studies,
(b) write an entrance examination in the Geological Sciences, covering those fields in which they claim competence at the undergraduate level,
(c) take Geology 500,
(d) take two additional 500 series courses, or in special cases, two full courses in an ancilliary science at the Honours level may be substituted on recommendation of the Supervisor of Research,
(e) take such additional non-credit courses in ancilliary sciences or Geology as may be required by the Supervisor of Research,
(f) prepare a thesis based on the candidate's own research,
(g) take a comprehensive examination,
(h) demonstrate a reading knowledge of geological subjects in a language other than English.

The Department offers instruction leading to the Degree of Doctor of Philosophy in certain fields of Geology. Details may be obtained from the Chairman. The candidate will be required to:

(a) comply with the general regulations of the School of Graduate Studies,
(b) prove his ability to do guided research either through satisfactory completion of an M.Sc. Thesis, or have reports or published papers to his credit which demonstrate his research ability,
(c) an entrance examination will be required from all students entering from another university,
(d) take at least one graduate course in Geology prescribed by the Department,
(e) take such other formal or directed reading courses as may, in the opinion of his supervisor of research, be deemed desirable to prepare the candidate for comprehensive examination in three fields of Geology,
(f) take comprehensive written and oral examinations in three fields of Geology,
(g) prepare a Thesis which is regarded as the culmination of his formal training in his profession. The thesis problem should be formulated by the candidate and the solution should be a contribution to basic knowledge in the Geological Sciences or related fields,
(h) defend his Thesis in public,
(g) demonstrate a reading knowledge of geological subjects in two languages other than English, one of which must be French or German.

The Geology course numbering system is laid out as follows:

100 series — Introductory subjects taken in Qualifying University year or First year.

200 series — Required subjects for Geology majors normally taken in the Second year.

300 series — Required subjects for Geology majors normally taken in the Third year.

400 series — Honours subjects, some of which may be taken by Pass course students with permission of the Department.

500 series — Graduate subjects, some of which may be taken by Honours course students with permission of the Department.

Within each series the subjects are divided into fields of interest as follows:

0- 8 — General courses or those covering several geological fields of study or research.

10-18 — General geology, geomorphology, structural geology.

20-28 — Mineralogy, crystallography, ore deposits, fossil fuels.

30-38 — Paleontology, micropaleontology.

40-48 — Oceanology and submarine geology.

50-58 — Petrology.

60-68 — Stratigraphy and sedimentation.

70-78 — Geological techniques.

80-88 — Geochemistry and geophysics.

90-98 — Theses and research projects.

In the following listing, full undergraduate courses end in '0' or '5', half courses (first term) in '1', '3', or '7', and half courses (second term) in '2', '4', '6', or '8'. An asterisk follows all half-courses.

GEOLOGY 100. [210]. *General Geology*

The Earth in space; evolution of the continents; rocks and minerals; mountain building and deformation; the cycle and agents of erosion; the history of life and the growth of geological ideas.

TEXTBOOKS: Longwell and Flint, *Introduction to Physical Geology;* Dunbar, *Historical Geology;* Hill, *General Geology Laboratory Manual.*

Day Division: Annually (lectures two hours a week, laboratory three hours a week, two half day field excursions *first* term, one full day field excursion after the final examinations).

Evening Division: 1962-63 (lectures two hours a week, laboratory two hours a week, two half day field excursions *first* term, one full day excursion after the final examinations). Evening students are required to sit mid-year and final examinations in the day division. Also summer 1962: lectures five hours a week, laboratory four hours a week plus field excursions.

Members of the Department

GEOLOGY 211*. [311]. *Structural Geology*

A systematic study of secondary rock structures and their origins. Laboratory: the use of maps; mathematical and graphical solution of depth, fold, and fault problems.

TEXT: Billings, *Structural Geology*, 2nd ed.

REFERENCE TEXTS: To be announced.

PREREQUISITE: Geology 100.

Day Division: 1962-63 (lectures two hours a week, laboratory three hours a week. *First* term).

Professor Hill

GEOLOGY 220. [320]. *Mineralogy*

Morphological study and classification of crystals. Essentials of crystal chemistry. Chemical and physical properties of minerals, systematic mineralogy of common silicates, sulphides, etc. Principles of optical crystallography. Laboratory work involves the study of crystal models, mineral identification and the use of the polarizing microscope.

TEXT: *Dana's Textbook of Mineralogy*, Revised by William E. Ford, 4th Edition, 1932.

REFERENCE TEXTS: Dennen, *Principles of Mineralogy*
                    Berry and Mason, *Mineralogy*
                    Phillips, *Introduction to Crystallography*

PREREQUISITE: Math. 35*, Chem. 10. May be taken concurrently.

> *Day Division*: 1962-63 (lectures two hours a week, laboratory three hours a week).

Members of the Department

GEOLOGY 272*. [372]. *Field Geology*

Techniques of geological mapping; the observation and interpretation of field data; the use of topographic maps and aerial photographs. Writing the geological report. (Half course).

PREREQUISITE: Geology 211.

TEXTS: Texts and supplementary reading to be announced.

> *Day Division*: 1962-63 (combined seminars and laboratory two hours a week, *second term;* fifteen days field work in the Spring of 1963 — exact dates to be announced later).

Professor Hill

GEOLOGY 330. *Palaeontology*

The principles of palaeontology; the classification of invertebrates, their morphology and evolutionary history. Reference to the broader phases of palaeobotany and vertebrate evolution. An introduction to the use of invertebrates in stratigraphic interpretation.

TEXT: Shrock and Twenhofel, *Principles of Invertebrate Palaeontology*.

REFERENCE TEXTS: Moore, Lalicker and Fischer, *Invertebrate Fossils*.
                   Shimer, *An Introduction to the Study of Fossils*.

PREREQUISITE: Geology 100, and Biology 20, or permission of the Department.

> *Day Division*: 1962-63 (combined seminars and laboratory five hours a week).

Professor Hooper

GEOLOGY 350. *Petrology*

An introduction to the basic principles of petrology. The composition, classification, fabric, occurrence, associations, and origin of the igneous, metamorphic, and sedimentary rocks. Brief introduction to the elements of thermodynamics, physical chemistry, and phase chemistry as they apply to petrology. Origin and evolution of igneous rocks. Chemical discussion of metamorphic assemblages and processes. The source, transport, and environment of the more important sedimentary rock types.
Laboratory: The optical properties of the more common rock forming minerals. Megascopic and microscopic examination of rocks and their constituents.

TEXTS: Turner and Verhoogen, *Igneous and Metamorphic Petrology*.
       Krumbein and Sloss, *Stratigraphy and Sedimentation*.
       Moorehouse, *The Study of Rocks in Thin Section*.

PREREQUISITE: Geology 220, Chemistry 10.

> *Day Division*: 1962-63 (combined lectures and laboratory six hours a week).

Professor Moore

GEOLOGY 360. (362 & 363). *Historical Geology*

Special emphasis is placed on the development of the North American continent. Course includes Precambrian and post-Precambrian geologic history, and the stratigraphy, physiography, petrography and metallogenic provinces are discussed.

TEXT: To be announced.

REFERENCE TEXTS: To be announced.

PREREQUISITES: Geology 211 and 220, Geology 350 and 330 (may be taken concurrently).

> *Day Division*: 1962-63 (lectures and laboratory three hours a week, assignments to be arranged).

Professor North

GEOLOGY 412*. *Advanced Structural Geology*

The earth's primary structural elements and their origin; structural disharmony; gravity tectonics; lineament tectonics. Laboratory: interpretation of tectonic maps.

PREREQUISITE: Geology 211 and 360.

TEXT: De Sitter, *Structural Geology*.

> *Day Division*: 1962-63 (lectures two hours a week, laboratory three hours a week).

Professor Hill

GEOLOGY 413. [312]. *Geomorphology*

(Offered as Geography 210 **Principles of Geomorphology. See Department of Geography**).

GEOLOGY 420. *Metallic and Nonmetallic Mineral Deposits*

The genesis and occurrence of metallic deposits. Controls of mineral localization. Methods of mining and extraction. The precious metals. The nonferrous metals. Ferrous metals. Minor metals.
Classification of mineral deposits. The economics and distribution of the nonmetallic minerals; the mineral fuels; structural materials; ceramics and refractories; industrial and chemical minerals; fertilizers and abrasives; gemstones; groundwater supplies.
Laboratory: Evaluation of mineral deposits, mineralography, and visits to operating mines in the area.

TEXT: Bateman, *Economic Mineral Deposits*.

REFERENCE TEXTS: Lindgren, *Mineral Deposits*, Others to be announced.

PREREQUISITES: Geology 211 (or equivalent), Geology 220.

> *Day Division*: 1962-63 (lectures, laboratories, and seminars five hours a week).

Members of the Department

"SOFT ROCK" OPTION

GEOLOGY 424*. *Geology of Mineral Fuels*

Geology of coal, petroleum, and natural gas; development of petroliferous basins.

REFERENCE TEXTS: Levorsen, *Petroleum Geology*.
Mackay, *Coal Reserves of Canada*.

PREREQUISITES: Geology 211, 360.

> *Not offered*, 1962-63.

GEOLOGY 431*. *Micropalaeontology*

Types of microfossils, their historical sequence and biostratigraphic significance. Micropalaeoecology. Local and regional correlation. Laboratory: examination and identifications of microfossils, with special reference to the Foraminifera. (Half course).

TEXT: Jones, *Introduction to Micropalaeontology*.

REFERENCE TEXTS: Cushman, *Foraminifera*.
Glaessner, *Principles of Micropalaeontology*.

PREREQUISITES: Geology 330 and permission of instructor.

> *Not offered*, 1962-63.

GEOLOGY 462*. *Advanced Stratigraphy*

Principles and practice of stratigraphy, not confined to North America.

TEXT: Weller, *Stratigraphic Principles and Practice.*

Not offered, 1962-63.

GEOLOGY 463*. (452, 461). *Advanced Sedimentation and Sedimentary Petrology*

Weathering processes, transportation of detritus, sedimentary processes, environments of deposition, dispersal patterns and sedimentary trends, grade scales, statistical devices, size analyses, heavy mineral preparation and study. The stereonet. Directional properties of fabric, texture and lithofacies. Regional analyses of primary sedimentary structures, paleo-geographic construction, tectonism and sedimentation. Composition, texture, primary structure and origin of the major sedimentary rock types. Source, transportation, history, and environment of deposition are interpreted with the aid of petrographic criteria.

TEXT: To be announced.

PREREQUISITE: Geology 350.

Evening Division: 1962-63 (lectures and laboratory five hours a week).

Dr. Donaldson

"HARD ROCK" OPTION

GEOLOGY 422*. *Advanced Mineral Deposits*

Geology of the more important mineral deposits of the world. Laboratory will consist of megascopic and mineralographic examination of ore specimens, with assignments.

TEXT: To be announced.

REFERENCE TEXT: To be announced.

PREREQUISITE: Geology 420.

Not offered, 1962-63.

GEOLOGY 451*. *Igneous and Metamorphic Petrology*

Detailed examination of classical problems in petrology. Introduction to the principles of phase equilibria and graphical representation of mineral systems. Laboratory to include the study of igneous and metamorphic suites, introduction to petrographic calculations, and other advanced laboratory techniques.

TEXT: Turner and Verhoogen, *Igneous and Metamorphic Petrology.*

REFERENCE TEXTS: Bowen, *Evolution of the Igneous Rocks.*
Harker, *Metamorphism.*

PREREQUISITES: Geology 350, Chemistry 210.

Day Division: 1962-63 (seminars and laboratory six hours a week, *first* term).

Professor Moore

GEOLOGY 464*. [363*]. *Precambrian Geology*

A detailed study of Precambrian rocks and mineral resources with emphasis on North America.

TEXT: To be announced.

REFERENCE TEXT: To be announced.

PREREQUISITE: Geology 360.

Not offered, 1962-63.

GEOLOGY 480. *Chemistry and Physics of the Earth*

Physical and chemical properties and characteristics of the earth. **Inferred physico-chemical** processes active throughout geologic time.

TEXTS: Reference texts and outside reading.

PREREQUISITES: Geology 451 or 463 (may be taken concurrently).

Day Division: 1962-63 (lectures three hours a week).

Professor Tupper, Drs. Boyle, Niblett

"SPECIAL" OPTIONS

GEOLOGY 425. *Economic Geology*

The principles of economics as applied to the mineral industries will be studied. The first half of the course will be the study of the subject areas above, and the second half will be devoted to the study of the economic geology of the more significant mineral industries.

TEXT: To be announced.

REFERENCE TEXT: To be announced.

PREREQUISITES: Geology 420 and Economics 110.

Evening Division: 1962-63 (lectures three hours a week with assignments).

Mr. Borden

GEOLOGY 471*. *Instrumental Analysis*

The theory and techniques of the instrumental methods of analysis, particularly as they apply to analytical problems in the earth sciences. Spectrophotometric analysis, colorimetry, fluorimetry, nephelometry, spectrographic analysis, flame photometry, mass spectrometry, X-ray diffraction and fluorescence spectrometry; neutron activation and radiometric analysis; electron microscopy; and digital computers.
Laboratory—exercises with the instruments to familiarize the student with the operation, use, and limitations of the various methods. Visits to instrumental laboratories in the Ottawa area.

TEXT: Willard, Merrit, and Dean, *Instrumental Methods of Analysis*.

REFERENCE TEXTS: Various reference texts and outside reading.

PREREQUISITES: Permission of the instructor, Chemistry 330.

Not offered, 1962-63.

GEOLOGY 481*. *Exploration Geophysics*

An introduction to the fundamental theory and application of geophysics to economic and structural geology. Laboratory work involves interpretation of geophysical and geological maps. Field work will introduce students to various geophysical instruments. (Half course).

TEXTS: Nettleton, *Geophysical Prospecting for Oil*.

Dobrin, *Introduction to Geophysical Prospecting*.

REFERENCE TEXTS: To be announced.

PREREQUISITES: Physics 100, or permission of the instructor.

Day and Evening Division: 1962-63 (combined lectures, labs, or field trips, five hours a week, *first* term).

Mr. Collett

GEOLOGY 482*. *Applied Geochemistry*

An introductory course; the chemical and physical factors responsible for the distribution and migration of the elements in the lithosphere, hydrosphere, atmosphere, and biosphere; geochemistry applied to mineral exploration. Laboratory work involves determination of trace amounts of the common metallic elements in water, rock, and soil. (Half course).

TEXT: Hawkes, *Principles of Geochemical Prospecting*

REFERENCE TEXTS: Mason, *Principles of Geochemistry*

Rankama and Sahama, *Geochemistry*

Goldschmidt, *Geochemistry*

Sandell, *Colorimetric Determination of Traces of Metals*

PREREQUISITES: Geology 100, 220 (may be taken concurrently), Chemistry 100.

Day Division: 1962-63 (combined lectures and laboratory five hours a week, *second* term).

Professor Tupper

GEOLOGY 491*. *Honours Thesis*

The B.Sc. thesis is to be based on a nonconfidential problem, undertaken either during the summer under adequate supervision, or during the University year in the Ottawa area under the supervision of the student's adviser.

GRADUATE COURSES

The following courses are available and will be offered as required.

GEOLOGY 500.

Mandatory: A two year seminar course of one hour bi-monthly. All graduate students and staff will participate in the discussion of geological problems.

GEOLOGY 509. *Directed Studies*

Studies in fields closely related to the graduate student's thesis problem, under the guidance of selected extramural directors.

GEOLOGY 510. *Geotectonics* (not offered 1962-63)   Professor North

GEOLOGY 520. *Advanced Mineral Deposits*

Theories of ore deposition are examined in detail. Lectures and seminars.

REFERENCES: To be announced.

PREREQUISITE: Geology 420.

Not offered, 1962-63.

Professor Young

GEOLOGY 525. *Advanced Crystallography*

Part I—Principles and techniques of X-ray crystallography; Part II—the interpretation of X-ray photographs and the application to the study of minerals. Parts I and II are to be given in alternate years.

REFERENCES: To be announced.

PREREQUISITE: Geology 220.

Dr. Chao

GEOLOGY 530. *Advanced Palaeontology*

Detailed studies of the morphology, classification, and geological history of selected fossil groups (mainly invertebrate).

REFERENCES: To be announced.

PREREQUISITE: Geology 431.

Professor Hooper

GEOLOGY 550. *Advanced Petrology*

Lectures and/or seminars presenting in detail the physical and chemical principles of igneous and metamorphic phenomena. Special emphasis is placed on phase equilibria. Discussion and review of modern literature.

REFERENCES: *Phase diagrams for Ceramists*, Vol. I and II.

Korzhinskii, *Physiochemical Basis of the Analysis of the Paragenesis of Minerals.*

PREREQUISITES: Chemistry 210, Geology 451.

Not offered, 1962-63.

Professor Moore

GEOLOGY 571. *Laboratory Problems*   Members of the Department

GEOLOGY 581*. *Chemistry of the Earth*

The material in Geology 480 at a more advanced level. The basic principles of chemistry as they apply to problems in geochemistry. The chemistry and genesis of igneous, metamorphic and sedimentary rocks. The geochemistry and evolution of the hydrosphere, atmosphere and biosphere. The geochemical cycle. Discussion of modern literature.

REFERENCES: Mason, *Principles of Geochemistry.*

Rankama and Sahama, *Geochemistry.*

PREREQUISITES: Geology 350 and preferably Chemistry 360.

Lectures three hours a week, *first term.*

Professor Tupper and Dr. Boyle

GEOLOGY 582. *Physics of the Earth*
      An advanced treatment of the physical properties of the earth.
                                          Dr. Niblett and others

GEOLOGY 590. *M.Sc. Thesis*
      Equivalent to two full courses.

GEOLOGY 595. *Ph.D. Thesis*
      Equivalent to five full courses.

GERMAN

Associate Professor; Chairman of the Department, 1962-63   E. M. Oppenheimer,
                                                        A.M., Ph.D.
Lecturer . . . . R. Astrid Zwingenberger, M.A.
Sessional Lecturers . . . . Martha Camfield, B.A.
Language Laboratory Lecturer . . . . . . Anna M. Rosenberg, B.A.

Students electing German alone or in combination as their *major subject* should
consult the department during their First year concerning their program.

The following *Combined Honours Programs* are available: (1) *Honours in
French and German* (see also p. 124) (2) *Honours in English and German*
(see also p. 118) (3) *Honours in German and Russian* (see also p. 175). These
programs take into account the requirements for Type A certificate courses of the
Ontario College of Education. For details, consultation with the University
Registrar and the departmental chairman is invited.

The language laboratory facilities will be used in German 15, 100 and 212.

GERMAN 15. [115]. *Elementary German*
      An introduction to the essentials of German grammar and composition. Oral practice.
      Guidance in the reading of scientific texts is available.
      TEXTS: Fehlau: *Fundamental German.*
              Goedsche: *Schweitzer; Mann.*
              Dürrenmatt: *Der Richter und sein Henker.*
          Day and Evening Divisions: 1962-63 (four hours, including one laboratory
              period per week).

GERMAN 100. [210]. *Intermediate German*
      Representative texts from the 18th, 19th and 20th centuries consisting of plays by Brecht or
      Dürrenmatt and Goethe. Prose by G. Keller and Th. Mann. Selected poems — Composition
      and oral practice.
      TEXT: (for composition): Dutton: *German Prose Composition.*
      PREREQUISITE: German 15 or equivalent.
          Day and Evening Divisions: 1962-63 (four hours, including one laboratory
              period per week).

GERMAN 211*. [311a]. *Advanced Composition* (two hours per week, *both* terms)
      TEXT: Kolisko and Yuill: *Practice in German Prose.*
      REFERENCE TEXTS: Farrell: *German Synonyms.*
                        Eggeling: *Modern German Prose Usage.*
      PREREQUISITE: German 100 or equivalent.
          Day or Evening Division: 1962-63.

GERMAN 212*. [311b]. *Conversation* (two hours per week, *both* terms)
PREREQUISITE: German 100 or permission of instructor.
Day or Evening Division: 1962-63.

GERMAN 250. [316]. *The Age of Goethe I (1750-1790)*
Literature of Enlightenment and Storm and Stress with special emphasis on Goethe. Other authors whose work is considered in detail are Schiller, Herder, Lessing.
TEXT: Killy: *Zeichen der Zeit I (Auf dem Wege zur Klassik)* and others to be announced.
PREREQUISITE: German 100 or equivalent.
Day or Evening Division: 1962-63 (three hours a week).

GERMAN 260. [317]. *The Age of Goethe II (1790-1830)*
Classicism; Romanticism; Goethe's later works, including Faust II. Other authors whose work is considered in detail are Schiller, Hölderlin, Kleist, Tieck, Novalis, Brentano, Eichendorff, Jean Paul.
Not offered, 1962-63.

GERMAN 270. [322]. *German Literature of the Nineteenth Century; Composition*
Not offered, 1962-63.

GERMAN 280. [325]. *German Literature of the Twentieth Century*
Shorter selections for orientation and detailed treatment of major representative texts.
TEXT: Killy: *Zeichen der Zeit IV (Verwandlung der Wirklichkeit)* and others to be announced.
PREREQUISITE: German 100 or equivalent.
Day or Evening Division: 1962-63 (three hours a week).

GERMAN 331*. [320]. *Medieval Language and Literature*
TEXT: Bachmann: *Mittelhochdeutsches Lesebuch.*
PREREQUISITE: German 100 or equivalent.
To be offered 1963-64.

GERMAN 341*. [321]. *Early Modern German Literature (1500-1700)*
This course covers study of selected literary texts of the period and deals with the history of the language proper including a survey of phonetics.
TEXTS: Gravier: *Anthologie de l'Allemand du XVIe siècle.*
Milch: *Deutsche Gedichte des* 16 & 17. Jahrhunderts.
REFERENCE TEXTS: Priebsch and Collinson. Bithell, Bach..
PREREQUISITE: German 100 or equivalent.
To be offered 1963-64.

GERMAN 480*. [390]. *Tutorial on selected topic*
Primarily for honours students in their final year. A genre, an author or a group of authors will be selected; methods of literary criticism are considered.
Day Division: 1962-63.

GREEK

(See Classics)

HISTORY

Professor; Chairman of the Department, 1962-63   .   David M. L. Farr, M.A., D.Phil.
Professor   .   .   .   .   James A. Gibson, M.A., B.Litt., D.Phil.
Associate Professors   .   .   .   .   G. S. Couse, B.A.
                                              S. R. Mealing, M.A., B.Litt.
Assistant Professors   .   .   .   John S. Moir, M.A., Ph.D., D. G. Bowen, M.A.
Lecturers   .   .   .   .   .   Naomi E. S. Griffiths, M.A., John W. Strong, M.A.
Sessional Lecturers   .   .   .   Ronald Grantham, M.A., W. G. Ormsby, M.A.
Honorary Lecturer   .   .   .   .   J. M. McQueen, M.A.

Courses in the Department of History are designed in part to enable students to benefit from the unique and extensive resources which are available in the national capital. Students in Canadian and colonial history are encouraged, for instance, to make use of the wealth of material found in the Public Archives of Canada and other agencies of the federal government. The advantages of Ottawa as a research centre are especially apparent in graduate studies in Canadian history, and in Commonwealth and international relations.

MAJOR IN HISTORY (THREE YEARS)

Students majoring in History in the Pass Course are required to complete at least *seven* courses in History. One of these courses must be History 115, taken in the First year. The remaining courses in History, as well as those selected in other subjects, must be chosen in consultation with a member of the Department.

Students who wish to major (or to take honours) in History will be expected to fulfil the summer reading requirements.

HONOURS IN HISTORY (FOUR YEARS)

An honours student is required to complete *twenty* courses beyond Senior Matriculation or the Qualifying University year. Courses taken in the First year should be those of the First year of the honours program in the social sciences, or the First year of the pass Arts course, including History 115 in either case.

Ten courses in History are required for the honours degree, of which the following *six* are specified:

History 115, 230, 235, 240, 488 and 496 (a dissertation).

The remaining *four* courses in History are to be chosen in the following manner:

One course from History 215 or 315;

One course from History 250, 257, 353, 356, 358;

Two courses from History 210, 225, 260, 300, 301, 325, 343, 370, 373, 380 or additional courses from the groups listed above.

In addition, the candidate must also take History 490, a seminar in historical method, as a half course for no credit.

At the end of the Fourth year each candidate will present a dissertation. The subject for study will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be publicly examined upon his dissertation after presentation. The dissertation is listed in the calendar as History 496.

Candidates will be required to show a proficient reading knowledge of a modern language other than English, preferably French or German.

Four courses must also be undertaken in a minor field — Political Science, Economics, Geography, English or another approved subject.

(For information regarding preparation for admission to the Ontario College of Education for the Interim High School Assistant's certificate, Type A, students are advised to consult the Registrar.)

COMBINED HONOURS

History and Political Science: Students intending to take this course should take History 115 or Political Science 100 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two Departments. The honours requirements include at least seven courses in History and seven courses in Political Science. A dissertation (History 496 or Political Science 490) is optional. The course pattern will be arranged so that the student may transfer either to full honours in History or to full honours in Political Science at the end of the Third year, if he then wishes to specialize more intensively.

History and Economics: Consideration will also be given to applications for joint honours in History and Economics.

GRADUATE STUDIES

The Department offers studies leading to the degree of Master of Arts in areas of history for which adequate documentary materials are available. The general regulations governing graduate studies will be found on pp. 76-78; in addition the following regulations of the Department should be noted.

The final year for the Master's degree in History will be composed of:
1. History 488 (The Philosophy of History)
   If this course or its equivalent has been taken for an undergraduate degree, another course will be substituted.
2. History 590 (Historical Method — Graduate Studies)
3. Two fields of directed study: History 530 and 533.
4. History 596 (Thesis — Graduate Studies).

In addition a reading knowledge of a modern language other than English, preferably French or German, will be required.

HISTORY 10. [110]. *Main Directions in Modern History*

This course will provide a survey of the forces which since 1870 have shaped the growth of world civilization. It will conclude with a consideration of the roots of the present world situation.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: 1962-63 (lectures two hours a week, group discussions monthly). Professor Moir, Mr. Grantham and Mr. Strong

HISTORY 100. [210]. *An Introduction to Western Civilization*

This course will aim at an explanation of the present Western way of life, with its problems, as the outcome of a process of civilization. It will survey the development of Western civilization since the fall of the Roman Empire.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: 1962-63 (lectures and discussion three hours a week).

Summer, 1962 (lectures and discussion five hours a week).

Professor Couse; Miss Griffiths

HISTORY 115. [220]. *Civilization during the Middle Ages*

This course will discuss the development of the civilization which characterized the West from the decline of the Roman Empire until the Renaissance. An examination will also be made of the history of the great civilizations of Asia during this period. Students who elect History as their major or honours subject are required to take this course rather than History 100.

Day Division: Annually (lectures and discussion three hours a week).

Summer, 1962 (lectures and discussion ten hours a week).

Professor Bowen

HISTORY 200. [300]. *Greece in the Ancient World*

(Offered in the Department of Classics as *Classical Civilization* 200. *See notation there*.)

Not offered, 1962-63.

HISTORY 201. [301]. *Rome in the Ancient World*

(Offered in the Department of Classics as *Classical Civilization* 201. *See notation there*.)

Evening Division: 1962-63   (lectures two hours a week).

HISTORY 210. [310]. *History of the Church and Christian Thought*

This course will survey the inuflence of the Church in Western society from its beginning to the present day, and will be concerned with both the history of the Church as an institution, and the development of Christian thought. (This course is listed also as Religion 210).

Day Division: 1962-63   (lectures and discussion three hours a week).

Professors Bowen and Moir

HISTORY 215. [322]. *History of Europe, 1378-1715*

This course will examine the influence of intellectual and religious revolution upon the course of Western civilization during the Renaissance and Reformation periods.

PREREQUISITE: History 115.

Day Division: 1962-63   (lectures and discussion three hours a week).

Professor Bowen

HISTORY 225. [315]. *Economic History*

(Offered in the Department of Economics as *Economics* 225. *See notation there*.)

HISTORY 230. [330]. *Canada from 1791: The Evolution of Canadian Self-Government*

This course will consider the constitutional evolution of Canada from representative to responsible government, and from federation to autonomy. Attention will also be given to the emergence of Canada into the world community.

Day Division: Annually (lectures three hours a week).

Evening Division: Summer 1962 (lectures five hours a week).

Professor Gibson, Mr. Ormsby

HISTORY 235. [335]. *History of North America in the Colonial Period*

An introduction to the history of Canada and the United States. The development of the Spanish, English, and French empires in North America will be described.

Day Division: 1962-63   (lectures and discussion three hours a week).

Professor Mealing

HISTORY 240. [340]. *History of the United States of America*

This course will consider the history of the United States in the national period, emphasizing political and economic factors.

Not offered, 1962-63.

Day Division: Summer, 1962 (lectures and discussion ten hours a week).

Professor Farr

HISTORY 250. [350]. *British Constitutional History*

This course will survey the development of the British constitution from its Anglo-Saxon beginnings, with the emphasis on the period after 1660. Use will be made of documents.

PREREQUISITE: History 115 or permission of the Department.

Evening Division: 1962-63 (lectures and discussion three hours a week).

Professor Moir

HISTORY 257. [357]. *The Tudors and Stuarts, 1485-1714*

This course will consider the major currents in sixteenth- and seventeenth-century British history, whether social, economic, political, religious, or intellectual.

PREREQUISITE: History 115.

Day Division: 1962-63 (lectures and discussion three hours a week).

Professor Mealing

HISTORY 260. *Modern Russia*

A survey of modern Russian history from the time of Peter the Great to the death of Stalin.

PREREQUISITE: History 210 or 220.

Day Division: 1962-63 (lectures and discussion three hours a week).

Mr. Strong

HISTORY 315. [326]. *History of Modern Europe, 1715-1919*

This course will be concerned primarily with the French Revolution and its aftermath in the general history of nineteenth-century Europe.

PREREQUISITE: History 100 or 115.

Evening Division: 1962-63 (lectures and discussion three hours a week).

Miss Griffiths

HISTORY 325. [360]. *Tne Economic Development of Canada*

This course is designed as an advanced course in the economic history of Canada and will stress the influence of geography and the impact of ideas and institutions from other areas upon North American development. (The course is listed also as *Economics 325*).

PREREQUISITE: Economics 100 or History 230 or 235.

Not offered, 1962-63.

HISTORY 343. *Canada-United States Relations*

This course will trace the development of Canadian-American relations from the end of the eighteenth century, with particular attention to the period since 1871.

PREREQUISITE: Permission of the Department.

Not offered, 1962-63.

HISTORY 353. *English Social History*

This course is intended primarily to provide a background for the study of **English** literature. It will concentrate upon the non-political history of England.

PREREQUISITE: History 115 or permission of the Department.

Not offered, 1962-63.

HISTORY 356. *Medieval Britain*

This course will examine the development of medieval English institutions from the Anglo-Saxon invasions. Attention will also be given to the language and literature of medieval England.

PREREQUISITE: History 115 or permission of the Department.

Not offered, 1962-63.

HISTORY 358. *British History from 1714*

The main emphasis of this course will fall on the nineteenth century, the major currents of which it will consider in their effect on Great Britain.

PREREQUISITE: History 115.

Not offered, 1962-63.

HISTORY 370. *British Expansion Overseas and the British Empire*

This course will consider the development of the British Empire and Commonwealth from the American Revolution to the present day.

PREREQUISITE: Permission of the Department.

Not offered, 1962-63.

HISTORY 373. *The British Commonwealth of Nations*

This course will deal with the philosophy, structure, and development of the Commonwealth association under the Crown.

PREREQUISITE: Permission of the Department.

Day Division: 1962-63 (lectures and discussion three hours a week).

Professor Farr

HISTORY 380. *An Introduction to the History of International Relations, 1900-1939*

The central theme of this course will be the attempt to establish a lasting peace after the First World War and the failure of that attempt.

PREREQUISITE: Permission of the Department.

Not offered, 1962-63.

HISTORY 488. [388]. *The Philosophy of History*

This is a seminar in which major historical writings and works in the philosophy of history will be examined in reference to such questions as the nature and importance of historical knowledge and the pattern of universal history.

PREREQUISITE: Permission of the Department.

Day and Evening Divisions: 1962-63 (lectures and discussion three hours a week).

Professor Couse

HISTORY 490. [390]. *Historical Method — Honours*

This seminar will discuss problems of historical method, including the sources of history, the essentials of historical research, historical criticism, the weighing of evidence, bias in historical recording, and the mechanics and vocabulary of historical writing with special emphasis on the preparation of historical papers.

Day Division: Annually (tutorial hours arranged).

Members of the Department

HISTORY 496. [396]. *Dissertation for Honours in History*

Candidates for honours in History will be required to present, at the end of their Fourth year, a dissertation involving research into a problem of historical interpretation, and in a fashion displaying an adequate competence in historical method. The subject for research will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be publicly examined upon his dissertation after presentation.

Day Division: Annually (tutorial hours arranged).

Members of the Department

HISTORY 530. *British North America, 1783-1867*

A seminar in the history of the British North American colonies from 1783 to 1867. Assignments will be required, together with a written examination.

Not offered, 1962-63.

HISTORY 533. *Canada since 1867*

A seminar in the history of Canada after 1867. Assignments will be required, together with a written examination.

Evening Division: 1962-63 (lectures and discussion two hours a week).

Professor Farr

HISTORY 590. *Historical Method — Graduate Studies*

This course will cover the same subjects as History 490, except that it will be directed towards the preparation of a graduate thesis in History.

Day and Evening Divisions: Annually (tutorial hours arranged).

Members of the Department

HISTORY 596. *Thesis — Graduate Studies*

A thesis, involving a substantial historical investigation, will be the principal requirement for the Master's degree in History. The subject will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be publicly examined upon his thesis after presentation.

Day and Evening Divisions: Annually (tutorial hours arranged).

Members of the Department

See also Geography 235, *Historical Geography*

Political Science 210, *Western European Government*

Political Science 310, *The Commonwealth in Asia and Africa*

ITALIAN

ITALIAN 15. [115]. *Introduction to Italian*

A beginning course. Grammar, reading, and oral practice.

Not offered, 1962-63.

ITALIAN 100. [220]. *Italian Literature*

A brief but inclusive review of Italian literature, with emphasis on reading and study of the important texts. Composition and oral practice.

Not offered, 1962-63.

JOURNALISM

Professor and Director of the Department
                              Wilfrid Eggleston, M.B.E., B.A., F.A.G.S.
Associate Professor   .   .   .   .   W. H. Kesterton, B.A., B.J.
Sessional Lecturer   .   .   .   .   Frances Oakes Baldwin, B.A., B.J.
Seminar Leaders   .   .   .   .   W. B. Herbert, B.A., LL.B.
                                                        Norman DePoe

Field Work Supervisor   .   .   .   .   Robert Gardiner

Note: Journalism subjects may be taken only by candidates for the degree of
Bachelor of Journalism.

JOURNALISM 110. [210]. *Preparatory Lectures for First-year Journalism Students*

A series of meetings with members of the staff of the Department of Journalism will be
arranged for the guidance of students enrolled in the First year of the Journalism course.
Details as to dates, themes, and instructors will be supplied to students by mail.   First-year
Journalism students will be expected to attend these sessions, but the lectures yield no
academic credit and no tuition fee is charged for them.

  Day Division: Annually (lectures arranged).

                                        Professors Eggleston and Kesterton

JOURNALISM 210. [310]. *Introduction to Journalism*

A broad survey of the whole field.   Discussion of free lance writing, with practical exercises
in the magazine article, newspaper feature, dramatic script, and the short story.   Marketing.
Personal qualifications and opportunities.   The main trends in the journalism of Canada from
1752 to the present will be examined, and important publications and representative
journalists of the period considered.   Some account of the press of other countries also will
be given.

  RECOMMENDED READING: Bond, *An Introduction to Journalism* (Brett-
    Macmillan).

  Siebert, Peterson and Schramm, *Four Theories of the Press* (University of
    Illinois Press).

  Day Division: Annually (lectures and practical exercises, four hours a
    week).

                                        Professor Kesterton and Mrs. Baldwin

JOURNALISM 220. [320]. *Fundamentals of Reporting*

The nature of news values; how to recognize and collect news; how to analyse, organize and
report it.   Interviewing and news gathering.   This is mainly a practical course, based on
assignments in reporting and other forms of writing.

  RECOMMENDED READING: Neal, *News Gathering and News Writing* (Prentice-
    Hall).

  Day Division: Annually (lectures and practical exercises, four hours a
    week; group discussions).

                                        Professors Kesterton and Eggleston

JOURNALISM 330. *Editing*

Copy-reading and head-writing.   This course will provide practical instruction in the duties
and responsibilities of the deskman, and training in reading copy and writing headlines.   The
responsibilities and opportunities of the editor in his community will be discussed; the press
and society; semantics; the ethics of journalism; freedom of the press; the law and the press;
censorship in war and peace; news policy; the sources and interpretation of foreign news;
layout; the use of illustrations.

  TEXT: Bastian, Case, and Baskette, *Editing the Day's News* (Macmillan).

  PREREQUISITE: Journalism 210.

  Day Division: Annually (lectures three hours a week).

                                        Professor Eggleston

JOURNALISM 340. *Interpretative Reporting*

Coverage of governmental activities and other specialized fields such as business, music, drama, the film, politics, the popularization of science, the column; the book review. Development of sources and contacts. Writing for the ear in the radio newscast, the radio talk and commentary. This is mainly a practical course based on assignments, and includes field work on a daily newspaper and a radio station. Methods of research; filing; work in newspaper library and morgue.

TEXT: MacDougall, *Interpretative Reporting* (Macmillan).

PREREQUISITE: Journalism 220.

Day Division: Annually (lectures and practical exercises averaging four or five hours a week).

Professor Eggleston

JOURNALISM 350. *Career Seminar in Journalism*

Round table discussions with guest speakers. Each student in Journalism 350 will be required to choose a current topic of Canadian interest for extensive live research and study as preparation for an oral report, which will be followed by questioning from instructor and group. Vocational guidance. Groups will be arranged whenever possible to meet the needs of those who have special interests or ambitions.

PREREQUISITE: For final year Journalism students.

Day Division: Annually (round table sessions, two hours a week, plus special seminars).

Members of the Department

MATHEMATICS

Professor, Chairman of the Department, 1962-63

M. S. Macphail, M.A., D.Phil., F.R.S.C.

Professor . . . . F. H. Northover, M.A., Ph.D.

Associate Professors . . . . P. R. Beesack, A.M., Ph.D.

D. K. Dale, B.A., M.Sc.

A. H. Lightstone, M.A., Ph.D.

D. W. Sida, M.Sc., Ph.D., F.R.A.S.

Lecturer . . . . R. B. Gamble, B.Sc.

Sessional Lecturers . . . . R. L. Beatty, B.A.;
L. J. Byrne, M.A.; I. Fellegi, Ph.D.; J. C. Gardner, B.A., M.Ed.; C. Moser, M.Sc.; Eunice Northover, M.A.; L. W. Rentner, B.A.; P. Robinson, Ph.D.; Velma Rust, Ph.D.; Barbara Turner, B.Sc.; A. J. Wickens, M.Sc.

PASS COURSE

Pass students must take Mathematics 100, 200, 210, and at least two additional full courses (or the equivalent in half courses), chosen with the approval of the Mathematics Department. At least one of the two additional courses must be numbered 300-399.

Students entering First year who plan to take major or honours in Mathematics should obtain the advice of the Department as to their choice of courses.

HONOURS COURSE

(For information regarding preparation for admissions to the Ontario College of Education for the Interim High School Assistants' certificate, Type A, students are invited to consult the Registrar).

Basic requirements: The Qualifying University and First years of the pass arts or science course, including Mathematics 100 and a first course in the minor.

Honours requirements:

1. At least 15 courses beyond First year:

Nine courses in Mathematics, numbered 300 or higher, and including Mathematics 200, 210, 300, 430.

Six additional courses, two of which must be from the humanities or social sciences.

2. All courses are chosen subject to the approval of the Department.

3. The candidate must demonstrate a reading knowledge of one of French, German, or Russian.

4. There will be a comprehensive examination at the end of each of the Third and Fourth years.

5. Combined honours in Mathematics and Physics may also be arranged. See *Physics*.

Note: Courses in Applied Mathematics and Statistics will be found listed, beginning on p. 152.

MATHEMATICS 15*. [110]. *Algebra*

Ratio, proportion, variation, theory of quadratics solution of equations, the progressions, interest and annuities, the function, permutations and combinations, binomial theorem. (Half course.)°

TEXT: Petrie, Baker, Levitt, and MacLean, *Algebra*

Evening Division: Annually (lectures two hours a week, *both* terms).

Mr. Rentner

MATHEMATICS 25*. [111]. *Geometry*

Cartesian co-ordinates. The straight line, circle and conics with some elementary properties. (Half course.)°

TEXT: Durrant and Kingston, *A New Analytic Geometry*

Evening Division: Annually (lectures two hours a week, *both* terms).

Mr. Gardner

MATHEMATICS 30. [116]. *Introductory College Mathematics*

Rational, real, and complex number systems; sets, relations, and functions; permutations, combinations, and probability; equations and inequalities; polynomial, rational, exponential, and logarithmic functions; trigonometric functions with applications; analytic geometry of two dimensions.

TEXT: Allendoerfer and Oakley, *Fundamentals of Freshman Mathematics*.

Day Division: Annually (lectures four hours a week).

Summer 1962 (lectures five hours a week).

Mr. Gamble

MATHEMATICS 35*. [112]. *Trigonometry*

Fundamental formulae, solution of triangles, logarithms, applications to problems in statics. (Half course.)°

TEXT: Petrie, Baker, Levitt, and MacLean, *Elements of Trigonometry and Statics*

Evening Division: Annually (lectures two hours a week, *both* terms).

Mr. Rentner

MATHEMATICS 100. [211]. *Calculus*

An introductory course in differential and integral calculus, with emphasis on the fundamental processes and applications. Some topics of algebra and geometry are also included, namely, polar coordinates, solution of equations, solid analytic geometry, complex numbers and determinants.

TEXT: Britton, *Calculus*.

PREREQUISITE: Mathematics 15*, 25*, 35* (permission *may* be granted to enter with two of these) or Mathematics 30.

Day Division: Annually (lectures four hours a week).

Evening Division: Annually (lectures four hours a week). Summer 1962 (lectures five hours a week).

Prof. Northover, Mr. Gamble, and Mrs. Rust

°Any one of Mathematics 15°, 25°, 35° carries half-course credit. Full-course credit is given when two or three of these are taken. Students are reminded that all three (or Mathematics 30) are prescribed in the Qualifying University year of the B.Sc. and the B.Com. courses, and for entry to the Engineering course. The tuition fee for one of the three is that of a half course; the fee for any two or three, taken in the same year, is that of a full course.

MATHEMATICS 130. [200]. *General Mathematics*

Deductive nature of mathematics; the axiomatic method; selected topics such as probability and theory of games with application to social and economic problems. Introduction to calculus and to recent developments in mathematics.

TEXT: Richardson, *Fundamentals of Mathematics*.
REFERENCE: Kemeny, Snell and Thompson, *Finite Mathematics*.
    Day Division: Annually (lectures three hours a week).

MATHEMATICS 137*. [247]. *Analytic Geometry, Spherical Trigonometry, and Algebra*

Conic sections, transformation of coordinates, solid analytic geometry. Spherical trigonometry. Solution of equations.

TEXTS: Rider, *Analytic Geometry*.
        Griffin, *Spherical Trigonometry*.
        Rosenbach and Whitman, *College Algebra*.
    Day Division: Annually, for first year Engineering students only (lectures three hours a week, *first* term).

                                                               Mr. Gamble

MATHEMATICS 200. [310]. *Calculus and Differential Equations*

Technique of integration, multiple integrals, partial differentiation, Taylor's theorem, indeterminate forms, curvature. Ordinary differential equations, with applications.

TEXT: Britton, *Calculus*
PREREQUISITE: Mathematics 100.
    Day Division: Annually (lectures three hours a week).
    Evening Division: 1962-63 (lectures three hours a week).
    Summer, 1962 (lectures five hours a week in evening division).

                            Professor Macphail and Professor Beesack

MATHEMATICS 210. [305]. *Algebra and Geometry*

Theory of equations; matrices and determinants; linear equations; discriminant and resultant, quadrics and rulings; principal axis transformation in two and three dimensions; invariants.

TEXTS: To be announced.
PREREQUISITE: Mathematics 100.
    Day Division: 1962-63 (lectures three hours a week).

MATHEMATICS 235*. [220]. *Mathematics of Investment*

Simple and compound interest; annuities: funding of debts; bonds; depreciation; elementary life contingencies. (Half course).

TEXT: Hart, *Mathematics of Investment*.
PREREQUISITE: Mathematics 15*, 25*, *or* Mathematics 30.
    Day Division: Not offered, 1962-63.
    Evening Division: 1962-63 (lectures three hours a week, *first* term).

MATHEMATICS 300. [320]. *Introduction to Analysis: Advanced Calculus*

Elementary theory of real numbers. Concept of a function: functions of a real variable, sequences. Concept of a limit. Functions of a single real variable: continuity and differentiability. Functions of several real variables: partial derivatives, the implicit function theorem and Jacobians. Riemann integral, multiple integrals, line and surface integrals, the convergence of infinite series and integrals; uniform convergence.

TEXT: To be announced.
PREREQUISITES: Mathematics 210 or 137*, and 200.
    Day Division: 1962-63 (lectures three hours a week).
    Summer, 1962 (lectures five hours a week in evening division).

                                                         Professor Beesack

MATHEMATICS 303. [326]. *Mathematical Methods*

Series solution of ordinary differential equations; Gamma, Bessel, and Legendre functions; solution of partial differential equations; Fourier series and integrals; Laplace transforms; vector analysis; complex variable theory.

TEXTS: Kells, *Elementary Differential Equations*.
            Reddick and Miller, *Advanced Mathematics for Engineers*.
REFERENCE: Woods, *Advanced Calculus*.
PREREQUISITE: Mathematics 200.
        Day Division: *Annually* (lectures three hours a week).

Professor Northover

MATHEMATICS 310. [315]. *Modern Algebra 1*

An introduction to concepts of modern algebra; integral domain, field, group, vector space, linear transformation.

TEXT: Johnson, *First course in abstract algebra*.
PREREQUISITE: Mathematics 210.
        Day Division: 1962-63 (lectures three hours a week).
        Summer, 1962 (lectures ten hours a week in day division).

MATHEMATICS 320. [317]. *Modern Geometry*

Foundations of Euclidean geometry; projective and non-Euclidean geometries.

TEXT: To be announced.
PREREQUISITE: Mathematics 210.
        Day Division: 1962-63 (lectures three hours a week).

MATHEMATICS 325*. [380]. *Differential Geometry*

Theory of curves and surfaces. (Half course.)

TEXT: Struik, *Introduction to Classical Differential Geometry*.
REFERENCES: W. Blaschke, *Differentialgeometrie I*.
                  C. E. Weatherburn, *Differential Geometry*.
PREREQUISITE: Permission of the Department.
        Day Division: 1962-63 (lectures three hours a week, *first* term).

Professor Northover

MATHEMATICS 326*. [381]. *Tensor Calculus*

A development of tensor calculus with application to the study of Riemannian spaces. (Half course.)

TEXT: To be announced.
PREREQUISITE: Mathematics 325*.
REFERENCE: Weatherburn, *Riemannian Geometry and the Tensor Calculus*.
        Day Division: 1962-63 (lectures three hours a week, *second* term).

MATHEMATICS 330. [340]. *Introduction to Mathematical Logic*

Propositional calculus and predicate calculus; structures; Boolean algebra, representation theorem; axiom of choice.

TEXTS: To be announced.
        Day Division: 1962-63 (lectures three hours a week).

MATHEMATICS 400. [375]. *Differential Equations*

Advanced theory of ordinary and partial differential equations.

TEXT: Burkill, *Theory of Ordinary Differential Equations*.
PREREQUISITES: Mathematics 300, 303.
        Day Division: 1962-63 (lectures three hours a week).

MATHEMATICS 403. *Mathematical Methods II*

Advanced theory of ordinary and partial differential equations. Methods of approximation to solution of ordinary differential equations, including approximation by convergent series, iterative methods. Asymptotic expansions: the method steepest descents and the WKB method. Theory and application of Laplace and other integral transforms. Introduction to integral equations and to calculus of variations.

TEXTS: Burkill, *Theory of Ordinary Differential Equations.*
Sneddon, *Elements of Partial Differential Equations.*

REFERENCES: Churchill, *Modern Operational Mathematics in Engineering.*
Piaggio, *Differential Equations.*
Smith, *Mathematical Methods for Scientists and Engineers.*

PREREQUISITE: Mathematics 303.

Day Division: 1962-63 (lectures four hours a week).

MATHEMATICS 405*. [365]. *Functions of a Complex Variable*

General properties of analytic functions. (Half course.)

TEXT: Copson, *Theory of Functions of a Complex Variable.*

PREREQUISITE: Mathematics 300.

Evening Division: 1962-63 (lectures three hours a week, *first* term).

MATHEMATICS 406*. [370]. *Special Functions*

Continuation of Mathematics 405°. (Half course).

TEXT: Copson, *Theory of Functions of a Complex Variable.*

PREREQUISITE: Mathematics 405*.

Not offered, 1962-63.

MATHEMATICS 407*. [371]. *Functions of a Real Variable*

Lebesgue measure; Lebesgue and Lebesgue-Stieltjes integrals for functions of one or two variables. (Half course).

TEXT: To be announced.

PREREQUISITE: Mathematics 300.

Evening Division: 1962-63 (lectures three hours a week, *second* term).

MATHEMATICS 410. [330]. *Modern Algebra II*

Groups, rings, fields. Galois theory.

TEXT: Van der Waerden, *Modern Algebra.*

PREREQBISITE: Mathematics 310.

Evening Division: 1962-63 (lectures three hours a week).

MATHEMATICS 430. [391]. *Problems and Readings*

Honours students work a number of advanced problems drawn from various sources. Readings are also assigned, and an examination is set, covering the whole course.

PREREQUISITE: Open only to honours Mathematics students.

Day or Evening Division: Tutorial hours arranged.

Members of the Department

MATHEMATICS 435*. [395]. *Directed Special Studies*

Honours students may be required to present a report or thesis on parts of mathematics not included in the courses listed above. (Half course).

PREREQUISITE: Open only to honours Mathematics students.

Members of the Department

The Mathematics Department is prepared to direct graduate students in **certain** branches of the following: Algebra, Applied Mathematics, Analysis, and Statistics.

A selection from the following courses will be offered if there is sufficient demand:

MATHEMATICS 500. [520]. *Real Variables, Fourier Series, Functional Analysis*

MATHEMATICS 502. [570]. *Functional Analysis II*
Continuation of Mathematics 500.

MATHEMATICS 504. [580]. *Integral Equations and Transforms*

MATHEMATICS 510. [540]. *Modern Algebra*
One of the following subjects will be treated; theory of groups, theory of rings, algebraic number theory, elementary algebraic geometry.

MATHEMATICS 530. [550]. *Mathematical Logic*
Completeness theorem of the predicate calculus; predicate calculus with equality; application to Algebra; decision problem, complete theories. Some recent research papers will be studied.

MATHEMATICS 533. [560]. *General Topology*
TEXT: J. L. Kelley, General Topology.

APPLIED MATHEMATICS AND STATISTICS

MATHEMATICS 240. [300]. *Applied Mathematics I*
An introductory course in Applied Mathematics — its methods and techniques.
TEXTS: Humphrey, *Dynamics.*
           Humphrey, *Statics and Hydrostatics.*
PREREQUISITE: Mathematics 100. Registrants for this course will find it useful if their overall program permits, to take Physics 100, previously or concurrently, as this will provide insight, through experimental facilities, into practical situations where mathematical techniques can be applied.
Day Division: Annually (lectures three hours a week).
                                                              Mrs. Northover

MATHEMATICS 255*. [230]. *Introduction to Statistical Methods*
Organization of statistical data; frequency distributions; grouped data; moments of a distribution; measures of central tendency, dispersion, skewness, kurtosis; probability theory; probability distributions and their applications — binomial, normal and Poisson distributions. (Half course). (See also Economics 220, Statistical Methods in the Social Sciences).
TEXT: To be announced.
PREREQUISITES: Mathematics 15* and 25* or 30.
Evening Division: Annually (lectures three hours a wtek, *first* term).
Summer, 1962 (lectures five hours a week in evening division, first half of summer term).

MATHEMATICS 256*. [235]. *Introduction to Statistical Analysis*
Sampling theory; statistical inference; applications of the "Z", "t", "F" and "chi-squared" distributions in tests of hypotheses; confidence limits; analysis of variance, experimental designs; randomized block, Latin square designs; test of homogeneity of variance; enumeration statistics; contingency test; least squares analysis; simple regression and correlation analysis. (Half course).
TEXT: To be announced.
PREREQUISITE: Mathematics 255*.
Evening Division: Annually (lectures three hours a week, *second* term).
Summer, 1962 (lectures five hours a week in evening division, second half of summer term).

MATHEMATICS 340. [350]. *Numerical Methods*

General computer concepts, machine organization; problem analysis, flow diagrams and coding. Compiler and interpretative systems.
Analytic and numerical techniques. Elementary applied matrix algebra. Linearization of non-linear relations and least squares. Finite differences; numerical integration and differentiation. Numerical solution of equations. Differential equations, relaxation methods.

TEXT: Stanton, *Numerical Methods for Science and Engineering*.

PREREQUISITE: Mathematics 100. Knowledge of the elements of differential equations and matrix algebra is also desirable.

Evening Division: 1962-63 (lectures three hours a week).

Mr. Wickens

MATHEMATICS 345*. *Applied Mathematics II*

An intermediate course in Applied Mathematics — its methods and techniques.

TEXT: To be announced.

PREREQUISITE: Mathematics 240. If students do not have Mathematics 303, by this time, it would be desirable, if possible, to take this course concurrently.

Day Division: 1962-63 (lectures three hours a week, *second* term).

MATHEMATICS 350. [355]. *Introduction to Statistical Theory*

Axiomatic treatment of probability; Stieltjes integrals; moments; generating functions; distribution functions — binomial, normal, Poisson, "t", "F" and "chi-squared"; limit theorems, law of large numbers; fundamentals in estimation procedures; consistent, efficient and sufficient estimates; maximum likelihood; tests of hypotheses; power functions; applications in the physical, biological and social sciences.

TEXT: To be announced.

PREREQUISITES: Mathematics 200 and 256*.

Evening Division: 1962-63 (lectures three hours a week).

MATHEMATICS 355*. [236]. *Statistical Analysis*

Application of hypergeometric, binomial, normal, Poisson, "t", "F" and "chi-squared" distributions; sampling inspection; sequential analysis; power of a test; quality control. (Half course).

TEXT: To be announced.

PREREQUISITE: Mathematics 256*.

Evening Division: 1962-63 (lectures three hours a week, *first* term).

MATHEMATICS 356*. [237]. *Sampling Theory*

Theory of sampling from finite populations; sampling methods and designs: random, stratified, cluster, systematic, and multi-stage sampling, ratio estimation; optimum allocation; relative efficiencies of different methods. (Half course).

TEXT: To be announced.

PREREQUISITE: Mathematics 256*.

Not offered, 1962-63.

MATHEMATICS 357*. [238]. *Experimental Designs*

Basic concepts of experimental designs; randomization, replication, algebraic models, orthogonal contrasts; discussion of models and analysis for randomized block, Latin square, confounded and partially confounded factorial experiments, split plot; missing plot techniques. (Half course).

TEXT: To be announced.

PREREQUISITE: Mathematics 256*.

Not offered, 1962-63.

MATHEMATICS 358*. *Correlation and Regression Analysis*

Least squares; simple linear and curvi-linear regression; multi-variate regression; multiple and partial correlation; time series; index numbers; growth curves — Gompertz, Logistic; simple models. (Half course).

TEXT: To be announced.

PREREQUISITE: Mathematics 256*.

Evening Division: 1962-63 (lectures three hours a week, *second* term).

MATHEMATICS 450. *Intermediate Statistical Theory*

Analysis of variance and covariance; linear hypotheses; multiple regression problems; sequential analysis; decision functions; non-parametric techniques.

TEXT: To be announced.

PREREQUISITE: Mathematics 350.

Not offered, 1962-63.

GRADUATE COURSES (APPLIED)

MATHEMATICS 540. [530]. *Advanced Statics and Analytical Dynamics*

General systems of forces and Poinsot's reduction to a single force and a wrench. Selected topics in Statics including potential theory. Dynamics of a particle and of rigid bodies including rotating frames of reference and the influence of the rotating earth. Constrained motion: motion of a particle on curves and surfaces. Kinetic energy, linear momentum and angular momentum of a rigid body: general equations of motion; motion under no forces. Tops and gyroscopes. Lagrange's equations for holonomic systems; extension to non-holonomic systems. Lagrange's equations for impulsive motion. Theory of small vibrations. Variational methods. Least action and Hamilton's principle.

PREREQUISITE: Mathematics 240 and 303.

TEXTS: Ramsey: *Dynamics II*.
       Ramsey: *Statics*.   Professor Northover

MATHEMATICS 541. [531]. *Hydrodynamics and Wave Motion*

The fundamental theory of fluid motion, including irrotational motion in two and three dimensions, vortices, discontinuous flow, Blasius' theorem, elementary aerofoil theory, wave motion, viscous flow.

PREREQUISITE: Mathematics 303 or the equivalent.

TEXT: Ramsey: *Treatise on Hydromechanics, Part II*.

             Professor Northover

MATHEMATICS 542. [532]. *Electromagnetic theory and Magneto-hydrodynamics*

Electromagnetic theory leading up to Maxwell's equations. Cartesian Tensors. The space-time continuum: the tensor formulation of Maxwell's equations and the Lorentz transformation. Propagation of electromagnetic waves through isotropic and anisotropic media.

Propagation through ionised gases and the magneto-ionic theory: critical (plasma) frequency: Martyn's theorem. An introduction to Magneto-hydrodynamics. Boundary value problems, Green's functions, and diffraction theory.

PREREQUISITE: Mathematics 303 or the equivalent.

TEXTS: Abraham and Becker: *Classical Electricity and Magnetism*.
       Jackson, *Classical Electrodynamics*.

REFERENCES: Stratton: *Electromagnetic theory*.
            Cowling: *Magneto-hydrodynamics*.

             Professor Northover

MATHEMATICS 544. [539]. *Advanced Problems and Readings*

In this course time will be devoted to the study of the special functions and methods often needed for the solution of problems at the research level. Research papers will also be studied. The intention is to give the student insight into the sort of attack needed for problems at this level.

             Professor Northover

MATHEMATICS 550. *Advanced Probability Theory*
    TEXT: To be announced.
    PREREQUISITE: Mathematics 256*, 300.

MATHEMATICS 551. *Advanced Mathematical Statistics*
    TEXT: To be announced.
    PREREQUISITE: Mathematics 300, 350.

PHILOSOPHY

Professor; Chairman of the Department, 1962-63   J. C. S. Wernham, M.A., S.T.M.
Associate Professor . . . . Bernard Wand, M.A., Ph.D.
Assistant Professors . . . James M. Thompson, M.A., R. S. Talmage, M.A.
Lecturer . . . . Andrew Jeffrey, M.A.

Majors in Philosophy will take a minimum of six courses in Philosophy. Special arrangements will be made for students proposing a combined major program. All majors will arrange their programs in consultation with the department.

A student may not major in Philosophy unless he obtains 'C' standing in the introductory course.

HONOURS COURSES

The honours program may be entered at the beginning of the First year, or by transfer from the pass course if second class standing has been attained. Philosophy 100 should be taken in the First year.

The honours program will consist of a minimum of eight courses in Philosophy, plus an honours thesis which will count as one course. The student's program for the Second year and subsequent years will be planned in consultation with the chairman of the Department. The following courses will be required: 100; 205; 210; 215; 220; 230; 305; 400.

Combined honours. Students who are interested in pursuing an honours program in which Philosophy is combined with another subject are invited to discuss the matter with the chairman of the department of Philosophy. The minimum requirement in Philosophy in this type of program will be six courses plus the honours thesis which will count as one course. The following courses will be required: 100; 205; 215; 400; either 210 or 310; either 220 or 230.

PHILOSOPHY 100. [215]. *Introduction to Philosophy*

An introduction to the various areas of Philosophy. The course will consist of lectures on logic, language, and scientific method; and on selected topics in ethics and theory of knowledge.

    Day Division: Annually (lectures three hours a week, discussion one hour a week).

    Evening Division: 1962-63 (lectures two hours a week, discussion two hours fortnightly).

Members of the Department

PHILOSOPHY 205. [310]. *Greek Philosophy*

An account of the early history of philosophical speculation in the Greek world, of the role of the Sophists and of Socrates; together with a study of selected writings of Plato and Aristotle.
PREREQUISITE: Philosophy 100 or permission of the Department.

    Day Division: Annually (lectures and discussion three hours a week).

Mr. Jeffrey

PHILOSOPHY 210. [340]. *Ethics*

A historical and critical analysis of the chief concepts used to explain and justify moral thinking and conduct. The theoretical accounts of the concepts of 'right', 'duty' and 'good', as they are found in the writings of modern and contemporary philosophers, are considered. An analysis of the nature of egoism, sympathy, and altruism is given in an attempt to determine the possibility of disinterested actions. Finally, the relationship between morality and certain political, religious, and scientific beliefs is examined.

PREREQUISITE: Philosophy 100; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Wand

PHILOSOPHY 215. [320]. *Modern Philosophy: 1600-1800*

An examination of the major philosophical writers of the seventeenth and eighteenth centuries. Selections will be studied from the works of Descartes, Spinoza, Leibnitz; Locke, Berkeley, Hume; and Kant.

PREREQUISITE: Philosophy 100; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Wernham

PHILOSOPHY 220. [380]. *Philosophical Analysis*

A brief account of the history of the movement will be followed by careful study of representative samples of analytic philosophy. Thereafter, an attempt will be made to determine the scope and usefulness of analytic techniques.

PREREQUISITE: Philosophy 100; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Talmage

PHILOSOPHY 230. [370]. *Logic and Scientific Method*

An investigation of the principles of deductive inference will first be undertaken through a study of the logic of truth functions and of quantificational logic. This will be followed by an examination of the nature and methods of the empirical sciences. In particular, an attempt will be made to determine what principles of non-deductive inference are employed in scientific thinking; and the concepts of law and probability, and the nature of scientific explanation, will be carefully considered.

PREREQUISITE: Philosophy 100; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

To be announced

PHILOSOPHY 240. [390]. *Aesthetics*

Analysis of problems in the description, interpretation and evaluation of works of art, including music, literature and the visual arts; together with the study of types of aesthetic theory.

PREREQUISITE: Philosophy 100; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Thompson

PHILOSOPHY 250. *Philosophy of Mind*

An attempt to answer some of the principal questions of the philosophy of mind. Among the topics to be considered will be: knowledge and belief, perception, the senses, memory, emotion, dreaming, personal identity, the unconscious and our knowledge of other minds.

TEXT: Ryle; *The Concept of Mind.*

PREREQUISITE: Philosophy 100; or permission of the Department.

Day Division: Annually (seminar two hours a week).

Professor Talmage

PHILOSOPHY 300. [350]. *Philosophy and Religion*

An investigation, both historical and systematic, into the relations between faith and reason; together with an examination of the question of the existence and nature of God. Texts to be studied will be representative of mediaeval Scholasticism, German Idealism, Existentialism, and Philosophical Analysis.

PREREQUISITE: Permission of the Department.

Day Division: Annually (seminar two hours a week).

Professor Wernham

PHILOSOPHY 305. [330]. *Modern Philosophy: 1800—.*

An examination of the major philosophical writers of the nineteenth and twentieth centuries: German idealism from Kant to Hegel; the anti-Hegelian philosophies of Marx, Kierkegaard, Schopenhauer and Nietzsche; evolution and the philosophy of Bergson; American pragmatism (James, Peirce, Dewey); Whitehead; a brief sketch of recent philosophy.

PREREQUISITE: Philosophy 100; and permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Thompson

PHILOSOPHY 310. [360]. *Social and Political Philosophy*

An examination of the concepts of society, state, natural law, inalienable rights and social justice; and a consideration of the moral basis of political obligation. Emphasis will be on analysis rather than on historical origins.

PREREQUISITE: Philosophy 100; and permission of the Department.

Day Division: Annually (seminar two hours a week).

PHILOSOPHY 400. [385]. *Philosophy Honours Thesis*

Members of the Department

PHYSICS

Professor; Chairman of the Department, 1962-63   John Hart, B.Sc., Ph.D., F.Inst.P.

Professor . . . . . . A. M. Munn, M.Sc., Ph.D., F.R.S.A.

Associate Professors . . . . . . G. R. Love, M.A., Ph.D., M. K. Sundaresan, M.Sc., Ph.D., T. J. S. Cole, B.Sc. (Eng.), B.Sc., Ph.D., A.C.G.I., R. C. Ghosh, M.Sc., Ph.D.

Lecturer . . . . B. Spenceley, M.A.

Sessional Lecturers . . . . . . C. E. Clifford, M.Sc., Ph.D., A. M. Guénault, B.A., Ph.D., T. R. Osborne, B.Sc., B.Ed., M. Romanowski, M.A., T. Y. Wu, B.Sc., A.M., Ph.D., F.R.S.C., G. W. Wyszecki, Dipl. Ing., Dr. Ing., F. R. Lipsett, M.A.Sc., Ph.D.

Senior Demonstrators . . . . . E. Butterill, B.A., R. Ruedy, Ph.D.

Demonstrators . . . . P. Cross, B.Sc., B. Gaizauskas, M.A., K. E. Hall, B.Sc., M.A., G. Sangster, M.A., P. W. Sargeant, B.Sc.

Senior Technician . . . . K. Hafner

Teaching Fellows . . P. Kelly M.Sc., M. O. Poirier, M.Sc., J. D. Cross, B.Sc.

Students taking a single course in physics should take Physics 10 or 100. Students taking more than one course in physics should take Physics 100. A minor in physics consists of Physics 100, 201 and 202.

PASS COURSE

The First year is that of the pass science course including Physics 100, Chemistry 100 and Mathematics 100. In the Second year the student takes Physics 201 and 202, Mathematics 200 and two other courses, one of which should be Chemistry 210 or Mathematics 210. In the Third year the following courses are taken: Physics 351, 330, 340, 345, Mathematics 303, one humanity. Pass students are not admitted to physics courses numbered higher than 369. General prerequisities are stated at the end of this section.

OTHER STUDENTS

Students taking a single course numbered higher than 299 are required to take Physics 341 concurrently. Engineering students may, with the permission of the School of Engineering and the Physics Department, take the lecture course Physics 330, without the accompanying laboratory course, Physics 341. Students taking more than one course are required to take Physics 340 concurrently. Students not taking honours in physics are restricted to courses numbered lower than 369. General prerequisities are stated at the end of this section.

HONOURS COURSE

The First year is that of the physics pass course. The Second year consists of Physics 201 and 202, Mathematics 200 and 210, Chemistry 210, and one humanity. In the Third year the following courses are taken: Physics 310*, 315, 325*, 330, 340, 345 and 370, Mathematics 303, and one humanity or social science. In the fourth year the following courses are taken: Physics 410*, 418*, 425*, 430*, 450, and 460 or 461, one mathematics course and one humanity. General prerequisites are stated at the end of this section.

During the vacation between the Third and Fourth year, students are required to familiarize themselves with a specialized topic; they will deliver a fifty minute dissertation upon that subject during the first term of the Fourth year. At the end of the Fourth year comprehensive examinations are given in physics and related mathematics, and the student must submit a thesis on his work carried out in Physics 460 or 461.

The fulfilment of the requirements stated in this paragraph is the responsibility of the student.

COMBINED HONOURS IN MATHEMATICS AND PHYSICS

Candidates who wish to take a B.Sc. degree with combined honours in Mathematics and Physics should normally take eighteen courses beyond First year, composed of seven courses in Mathematics, seven courses in Physics, two non-science, non-mathematics courses and two other courses chosen in consultation with the Mathematics and Physics Departments.

BACHELOR OF SCIENCE WITH HONOURS IN APPLIED PHYSICS

Admission Requirements: Admission is open only to students who have completed the first two years of the regular engineering course, Physics 201 and 202 with a minimum standing of high second class honours.

Length of Course: Subsequent to the two years in engineering, candidates will take twelve courses spread over two years, making a total of four years from Senior Matriculation.

Course Selection: Courses will be selected in consultation with the chairman of the Physics Department. General prerequisites are stated at the end of this section.

GRADUATE STUDIES

Graduate students will be accepted, at the discretion of the Department, for full-time work in the physics research laboratories under the supervision of members of the Department. A Master's degree may be obtained on a part-time basis. Some assistantships are available. Full regulations for graduate study are available separately. Courses numbered higher than 499 are restricted to graduate students.

LANGUAGE

Candidates for Physics degrees must show a reading knowledge of French, German or Russian. An examination to satisfy this requirement may be written during any regularly scheduled examination period only. Requests for examination should be submitted to the Chairman of the Department by March 15th; application for examination is the responsibility of the student.

PHYSICS 10. *General Physics*
A survey of general elementary physics.
TEXT: P.S.S.C. *Physics*.
PREREQUISITES: Mathematics 15*, 25*, and 35*, or Mathematics 30 (may be taken concurrently).
    Day Division: Annually (lectures three hours per week, laboratory three hours per week).
                                    Professor Ghosh and Mr. Kelly

PHYSICS 100. [205]. *Introductory Physics*

This elementary and basic course of limited scope, with attention to detail, is designed for students who will graduate in physics or engineering. Students who intend to follow other scientific disciplines may also register. The lectures begin with an exhaustive study of simple Newtonian mechanics, which is applied to the motion of charged particles, using the methods of calculus as necessary. The classical Bohr atom is analysed. Light and sound are introduced as special applications of wave theory; the study of simple harmonic motion earlier in the course is used to illustrate some limited aspects of alternating current circuit theory. The fundamentals of field theory with particular reference to gravitational and electrical effects are discussed. The simpler aspects of particle physics are covered.

TEXTS: Avery and Ingram, *Laboratory Physics*.

Fowler and Meyer, *Physics for Engineers and Scientists*

Stauden, *Science is a Sacred Cow*.

Laboratory Instructions, Lecture Notes and Problems for Physics 100.

PREREQUISITES: Physics 10, Mathematics 100 (may be taken concurrently).

Day Division: Annually (lectures three hours per week, laboratory three hours per week).

Professor Hart

PHYSICS 201. [305]. *Introductory Electricity and Magnetism*

The electrical field theory, introduced in Physics 100, is extended to cover in some detail theorems in electromagnetism, including electromagnetic induction. Elementary D.C. and A.C. circuit theory up to transfer impedance is presented in detail. The principles of complex numbers and complex circuit theory are discussed briefly. The photo-electric effect and Bohr atom are examined in a little more detail than in Physics 100 and the course closes with a brief excursion into circuits involving vacuum tubes. The laboratory consists of straightforward electrical measurements.

TEXT: Shortley and Williams, *Physics, Vol. II*

REFERENCE: Winch, *Electricity and Magnetism*

PREREQUISITES: Physics 100, Mathematics 100; Mathematics 200 may be taken concurrently.

Day Division: Annually (lectures three hours per week, laboratory three hours per week).   Professor Love

Evening Division: 1962-63   (lectures three hours per week, laboratory three hours per week).

Dr. Clifford and Mr. Hall

PHYSICS 202. [304]. *Advanced General Physics*

This course extends the work begun in Physics 100 to more difficult topics in the field of classical dynamics, using vector notation. The classical mechanical properties of gases, liquids and solids are summarized. Surface waves on a liquid and sound waves are discussed. There is an introduction to the elements of thermodynamics and kinetic theory. In the field of optics, emphasis is placed on diffraction and interference, and on an introductory discussion of continuous and discrete spectra. The laboratory work is planned to teach the student techniques in accurate physical measurement.

TEXTS: Sears, F. W., *Mechanics, Wave Motion, and Heat* (Addison Wesley)

Sears, F. W., *Optics*

PREREQUISITES: Physics 100; Mathematics 100; Mathematics 200 (may be taken concurrently).

Day Division: Annually (lectures three hours per week, laboratory three hours per week).

Professor Cole

PHYSICS 310*. *Thermodynamics* (Half Course)

The method of thermodynamics and the first and second laws are discussed exhaustively. Applications of the laws are discussed in fair detail. The course includes the theory of specific heats and an introduction to the theory of transport phenomena.

TEXT: Zemansky, *Heat and Thermodynamics;* Sears, *Thermodynamics*.

Day Division: Annually *first* term (lectures three hours per week).

Professor Munn and Mr. Poirier

PHYSICS 315. *Optics*

An advanced and detailed study is made of diffraction and interference phenomena; polarization is also discussed. There is an introduction to electron optics. At the end of the course there is a brief summary of the mechanism of the reflection and refraction of electro-magnetic waves at all frequencies.

TEXT: Valasek, *Introduction to Theoretical and Experimental Optics*

Day Division: Annually (lectures two hours per week).

Professor Ghosh

Physics 325*. *Electromagnetism* (Half Course)

Classical elemectromagnetism is studied in detail, using the method of vector calculus. Current electricity is taken up to the concept of transfer impedances of large meshes. There is a summary of the properties of dielectrics and magnetic materials.

Text: Whitmer, *Electromagnetics*.

Prerequisite: Mathematics 310.

> *Day Division*: Annually *second* term (lectures three hours per week).

Mr. Spenceley

Physics 330. *Atomic Physics*

This course extends work started in Physics 100 and 201 on specific charge and the determination of ionic mass and charge. Rutherford scattering and the Bohr theory are studied. Special relativity and the rudiments of quantum mechanics are introduced; then follow the details of atomic, molecular and X-ray spectroscopy. Compton, Zeeman and Stark effects are discussed. The course concludes with an elementary introduction to nuclear physics.

Text: Peaslee, *Elements of Atomic Physics*.

> *Day Division*: Annually (lectures three hours per week).

Professor Ghosh

Physics 340. *Third year Laboratory*. Six hours laboratory per week.

> Physics 341. *Selected experiments* from Physics 340. Three hours laboratory per week.

Mr. Spenceley

Physics 345. *Laboratory Technique*

During this course the student learns basic technical operations used in the design and construction of research apparatus.

> *Day Division*: Three hours workshop per week.

Mr. Hafner

Physics 370. [420]. *Vector Mechanics*

Classical dynamics is dealt with in detail in one, two and three dimensions. Small oscillations, coupled systems, normal co-ordinates, Lagrange's and Hamilton's methods applied to particles, and tops and gyros are discussed. Fourier analysis as applied to physical problems is examined in detail. There is an elementary discussion of some of the principles of fluid dynamics.

Text: Becker, *Introduction to Theoretical Mechanics*

> *Day Division*: 1962-63 (lectures three hours per week).

Students may substitute Mathematics 530 for full credit.

Professor Munn

Physics 410*. *Quantum and Statistical Mechanics* (Half Course)

The course starts where 310* left off, with a discussion of the relationship of thermodynamics to statistical mechanics. Subjects discussed include classical statistics, Fermi-Dirac and Bose-Einstein statistics, and the Boltzmann equation. There is also a brief excursion into low-temperature physics. Sommerfield's model of a metal is also discussed.

Text: R. B. Lindsay, *Physical Statistics*.

Reference: Hill, *Statistical Mechanics*.

Prerequisite: Physics 310.

> *Day Division*: Annually, *first* term (lectures three hours per week).

Professor Sundaresan

Physics 418*. *Electron Physics* (Half Course)

The course starts with a detailed discussion of the electrical and mechanical properties of solids. Contact potentials and work functions are studied. The fundamental physics of vacuum tubes is discussed briefly. The theory of operation of solid-state devices is developed from physical models, and the Hall effect in such devices is dealt with. Developments in thermo-electricity are mentioned.

Text: van der Ziel, *Solid State Physical Electronics*

Prerequisite: Physics 410.

> *Day Division*: Annually *second* term (lectures three hours per week).

Professor Cole

PHYSICS 425*. *Electromagnetic Radiation* (Half Course)

The implications of Maxwell's equations are discussed in detail and there is a further brief account of reflection, refraction, diffraction and dispersion at all frequencies. Applications of theory to such things as waveguides are studied, and particle accelerators are described briefly.

TEXT: Slater and Frank, *Electromagnetism.*
REFERENCE: Panofsky and Philips, *Classical Electricity and Magnetism.*
PREREQUISITE: Physics 325.

> *Day Division*: Annually *first* term (lectures three hours per week).

Professor Cole

PHYSICS 430*. *Nuclear Physics* (Half Course)

The course starts where Physics 330 left off; basic facts about nuclei and nuclear forces are discussed in further detail. The passage of charged particles and radiation through matter is described. A detailed study of the alpha and beta instability of nuclei is followed by a discussion of nuclear excited states, gamma emission and internal conversation. Nuclear models are introduced with particular emphasis on the shell model. After a discussion of nuclear reactions, the course is rounded off with a review of particle physics.

TEXT: Halliday, *Introductory Nuclear Physics.*
PREREQUISITE: Physics 330.

> *Day Division*: Annually *second* term (lectures three hours per week).

Professor Sundaresan

PHYSICS 435. [335]. *Theoretical Physics*

This course constitutes an introduction to the theories of quantum mechanics and special and general relativity. In quantum mechanics, the Schroedinger wave theory, the Heisenberg matrix theory and the Dirac symbolic theory are discussed and applied to problems in one and three dimensions. The Dirac theory of the electron is examined. In special relativity theory the mechanics of mass points, of continuous matter, and of electrodynamics is discussed. In general relativity the field equations are derived and solved for the Schwarzchild field.

TEXTS: Rojansky, *Introductory Quantum Mechanics*
       Bergmann, *Introduction to the Theory of Relativity*
PREREQUISITE: Physics 370.

> *Day Division*: Annually (one three-hour seminar per week).

Professor Munn

PHYSICS 450. *Fourth Year Laboratory.* Three hours per week.

The individual laboratory experiments are supervised by members of the department. Students have some choice of experiment, among the apparatus available, and are normally expected to perform one experiment each one or two weeks.

Mr. Spenceley

PHYSICS 460. [360]. *Laboratory Project* ⎫
PHYSICS 461. *Theoretical Project*   ⎬

This is an advanced project course with an orientation towards research; the presentation of a thesis is required.

> *Day Division*: Annually, a minimum of six hours laboratory or private study per week.

PHYSICS 501. *Graduate experimental research leading to a Master's degree thesis*

PHYSICS 502. *Graduate theoretical research leading to a Master's degree thesis*

PHYSICS 503. *Graduate experimental research leading to a Doctor's degree thesis*

PHYSICS 504. *Graduate theoretical research leading to a Doctor's degree thesis*

PHYSICS 505. *Selected Topics in Physics*

During a full course of post-graduate study a student may, with the permission of the Department, take more than one selected topic. In that case each full course in Physics 505 will be counted for credit. Not more than one selected topic may be counted for credit in any one academic year.

Members of the Department

PHYSICS 506. *The Structure of Matter*

A post-graduate tutorial course in which theories of the fundamental physical properties of matter and their relationship with experimental observations are discussed.

TEXT:

Day Division: 1962-63 (one two-hour seminar per week).

Professor Sundaresan

PHYSICS 507. *Solid State Physics*

The work in Physics 506 is extended to a study of modern theories of the structure of solids, particularly dielectrics and semiconductors.

TEXT: Dekker, *Solid State Physics.*

PREREQUISITE: Physics 506.

Day Division: 1962-63 (one two-hour seminar per week).

Dr. Lipsett

PHYSICS 508. *Advanced Quantum Mechanics*

A post-graduate tutorial course which extends the work covered in Physics 435 to a detailed study of a few particular topics.

PREREQUISITE: Physics 435.

Not offered, 1962-63.

PHYSICS 509. *An Introduction to Precision Physical Measurements*

The theory of the treatment of high precision experimental observations is considered in detail. The theoretical results are illustrated by particular measurements of this type especially in the field of electricity and magnetism.

Not offered, 1962-63.

PHYSICS 510. *Precision Physical Measurements (Radiation Optics)*

Survey courses of the experimental methods used in making standardization measurements with the highest precision in many fields of applied physics.

Day Division: 1962-63 (one two-hour seminar per week).

Dr. Wyszecki

PHYSICS 511. *Statistical Mechanics*

The aim of this course is to give post-graduate students who are working in the dielectrics field an understanding of the fundamental principles of statistical mechanics. The emphasis is on general theory rather than on particular applications.

TEXT: Hill, *Statistical Mechanics.*

Day Division: 19626-63 (one two-hour seminar per week).

Dr. T. Guenault

PHYSICS 512. *Dielectrics*

A detailed study of electric polarization and relaxation in solids, liquids and gases.

Day Division: 1962-63 (one two-hour seminar per week).

Professor Hart

PREREQUISITE: *Students are not permitted to register in courses higher in number than 299 unless they have obtained a B average in Physics 100, 201, 202 (or Engineering 211, 220 and 240), and Mathematics 100. Enrolment in laboratory courses may be restricted by the limitation of physical facilities.*

PHYSICS HONOURS COURSES BY YEAR

First Year   — 100 Six hours per week, all year.

Second Year — 201 Six hours per week, all year.
             202 Six hours per week, all year.

Third Year — 310* Three hours per week, *first* term.
             315 Two hours per week, all year.
             330 Three hours per week, all year.

325* Half Course, three hours per week, *second* term.
340 Six hours per week, all year.
345 Three hours per week, all year.
370 Three hours per week, all year.

Fourth Year — 410* Half Course, three hours per week, *first* term.
418* Half Course, three hours per week, *second* term.
425* Half Course, three hours per week, *first* term.
430* Half Course, three hours per week, *second* term.
435 Three hours per week, all year.
450 Three hours per week, all year.
460 At least six hours per week, all year.

POLITICAL SCIENCE

Professor; Chairman of the Department, 1962-63 . Donald C. Rowat, A.M., Ph.D.
Professor . . . . R. O. MacFarlane, M.A., Ph.D.
Visiting Professor . . . . . R. A. MacKay, Ph.D., LL.D., F.R.S.C.

Associate Professors . . . . . . { Douglas G. Anglin, M.A., D.Phil.
(on leave of absence, 1962-63)
Pauline Jewett, M.A., Ph.D.
Kenneth D. McRae, A.M., Ph.D.

Assistant Professor . . . . Adam Bromke, M.A., Ph.D.
Lecturers . . . . J. Duncan Edmonds, B.A.
Kenneth E. Kitchen, B.A.
Sessional Lecturers . . . . . . Lionel D. Feldman, M.A.
C. S. Juvet, B.Com., M.A.
J. H. Scarffe, M.A.
A. M. Willms, M.A.
Teaching Fellow . . . . A. Cruttwell-Vaughan, B.A.

Ottawa provides a wealth of resources, both in personnel and in research materials, for the student of government, politics, public administration, and international relations. Undergraduates will be assisted in making the fullest use of these unique advantages of the national capital.

Students who wish to major or take honours in Political Science will be expected to fulfil the summer reading requirements at the beginning of their Second year.

MAJOR COURSE (3 years)

Majors in Political Science (or a combined major including Political Science) require five or more courses in the Department including Political Science 100, 230 and at least one of 210, 220 and 260. They will also be expected to take a certain number of courses in related Social Sciences. Final year majors with the required standing may, with permission, be admitted to Fourth year honours courses. The entire program must be approved by the Chairman of the Department.

A major must obtain at least 'C' in Political Science 100 to enter Second year and must maintain an overall average of at least 'C' in his Political Science courses to continue into Third year. (For special supplemental examinations to raise grades, see page 40).

Honours programs may be entered from the Honours First year in the Social Sciences (see pp. 73-75), or by transfer from the Major Course if second class standing or better has been obtained. Honours students will be assigned individual tutors to advise them on their studies. The following programs are available.

Political Science. For full honours, nine courses in Political Science will be required, including Political Science 100, 230, 260, 490, and 300 or 400. Candidates will normally be asked to present a graduation essay on some topic involving independent investigation, the subject to be chosen in consultation with the Department. They must select a minor field or fields, preferably in Economics, History, Philosophy or Sociology, and by the final year must show a reading knowledge of a language other than English, preferably French, German, or Russian.

Political Science and Economics. Political Science and History. Political Science and Sociology. Students intending to enter one of these programs should take Political Science 100 and the other introductory course in their First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two departments.

The honours requirement in *Political Science and Economics* includes at least six courses in each discipline, one of which must be Political Science 490 or Economics 495, to be taken in the student's final year.

The honours requirement in *Political Science and History* includes at least seven courses in each discipline, one of which must be Political Science 490 or History 496, to be taken in the student's final year.

The honours requirement in *Political Science and Sociology* includes at least six courses in each discipline, and in addition to Political Science 100 and Sociology 100 must include Political Science 230 or 430, three of Political Science 210, 220, 300, 310, and 320; Sociology 200, and three of Sociology 245, 250, 300, 320, 340, and 350. In his final year the student will also take either Political Science 490 or Sociology 470.

All combined honours programs will be arranged so that the student may transfer to full honours in Political Science or to full honours in the other field at the end of the Third year, if he then wishes to specialize more intensively.

Public Administration. The Honours program in Public Administration is outlined on pp. 54-56.

Honours and combined honours students may not be required to write final examinations in their Political Science courses in their final year. Instead, there may be a written comprehensive examination.

The Department of Political Science offers studies leading to the degree of Master of Arts. Facilities for research and supervision are available in the following fields:

> *Canadian government*: federal, provincial and local
> *Federalism*: Canadian and comparative
> *Public Administration*: Canadian and comparative
> *Comparative government*: American, European, Soviet, Commonwealth and African
> *Political behaviour and the political process*
> *History of political thought*
> *International relations and institutions*

For the Graduate Diploma in Public Administration and the degree of Master of Arts in Public Administration, see pages 58-60.

Admission. Students with an honours degree in Political Science and at least second class standing normally may complete the requirements for the M.A. in a minimum of one year. Those with deficiencies in their undergraduate program may have to take additional courses. Graduates who have majored in Political Science will ordinarily be required to complete a qualifying year consisting of five approved graduate or senior undergraduate courses. Honour graduates in fields other than Political Science will be considered on the basis of their courses of study and standing. For further details, consult the Chairman of the Department.

Degree requirements

1. A substantial thesis involving original research in an approved field of study (equivalent to two courses).
2. Three approved graduate courses in Political Science. One, or in exceptional cases two, of these may be 400 level courses.
3. A comprehensive examination on *two* of the following fields: Canadian government, comparative government, political behaviour and the political process, public administration, local government, political theory, international relations. One of these fields will normally be the general field of the thesis. Candidates will be assigned a tutor or tutors who will advise them in preparing for this examination.
4. A reading knowledge of a modern language other than English, preferably French, Russian or German.

FIRST YEAR

POLITICAL SCIENCE 100. [210]. *Introduction to Political Science*

An introduction to the theory and practice of modern political ideas and institutions, with particular attention to the structure of the government of Canada.

TEXTS: Corry and Hodgetts, *Democratic Government and Politic.*
Dawson, *The Government of Canada.*

Day Division: lectures and discussion three hours a week.

Evening Division: lectures and discussion three hours a week.

Summer Session: *Evening Division*: lectures and discussion five hours a week.

Members of the Department

SECOND YEAR: Majors and Honours

POLITICAL SCIENCE 210. [310]. *Government and Politics in Western Europe*

A comparative study of government and politics in Great Britain, France, and other European democracies.

PREREQUISITE: Political Science 100.

Day Division: lectures and discussion three hours a week.

Professor Rowat and Mr. Kitchen

POLITICAL SCIENCE 220. [335]. *Government and Politics in the United States*

A survey of American political thought and constitutional development and an analysis of the American governmental process, with particular reference to the role of political parties and pressure groups.

PREREQUISITE: Political Science 100.

Day Division: lectures and discussion three hours a week.

Mr. Edmonds

POLITICAL SCIENCE 230. [360]. *History of Political Thought*

A general survey of the history of some phases of thought, with special reference to political theory, from ancient times to the close of the eighteenth century. A course in ideas, their sources, their validity, and their significance. Some of the works of the following authors are among the material considered: Plato, Aristotle, Machiavelli, Bodin, Hobbes, Locke, Rousseau, and Burke.

PREREQUISITE: Political Science 100, or permission of the Department.

Evening Division: 1962-63 and alternate years, lectures and discussion three hours a week.

Day Division: 1963-64 and alternate years.

Professor McRae

POLITICAL SCIENCE 260. [380]. *International Politics*

An introduction to the study of international politics, particularly in the period from 1939 to the present.

PREREQUISITE: Political Science 100, or permission of the Department.

Day Division: lectures and discussion three hours a week.

Professor Bromke

THIRD YEAR: Majors and Honours

POLITICAL SCIENCE 300. [320]. *Canadian Federalism*

An analysis of the Canadian federal system, and of federalism generally, including such matters as the written constitution; trends in judicial interpretation and the nature of the judicial process; problems of constitutional amendment, disallowance and reservation; political, economic and administrative relations between central and provincial governments; the impact of federalism on governmental institutions; the role of political parties in province and nation; the relationship between federalism, political parties, and democracy.

PREREQUISITES: Political Science 100 and preferably a further course in Political Science.

Day Division: 1962-63 and alternate years, lectures and discussion three hours a week.

Evening Division:1963-64 and alternate years.

Professor Jewett

POLITICAL SCIENCE 310. [315]. *The Commonwealth in Asia and Africa*

A comparative study of the evolution and working of political institutions in India, Pakistan, Ceylon and Malaya, and Commonwealth countries in West, Central and East Africa (and also in the Republic of South Africa and the West Indies).

PREREQUISITES: Political Science 100 and preferably a further course in Political Science.

Not offered, 1962-63.

Day Division: 1963-64, lectures and discussion three hours a week.

POLITICAL SCIENCE 320. [330]. *Soviet Government and Politics*

An introduction to the study of a communist political systnem: its theoretical foundations, the role of the Communist Party and Soviet political institutions. Some attention will be paid to the impact of the Soviet political model on China, Yugoslavia and some other communist countries.

PREREQUISITES: Political Science 100, and preferably a further course in Political Science or History 260.

Day Division: lectures and discussion three hours a week.

Professor Bromke

POLITICAL SCIENCE 340. *Problems in Public Administration*

A comprehensive survey of problems in Canadian public administration, with concentration on those at the national level. The course includes an examination of departmental organization in theory and practice, informal organization and the human element, semi-independent agencies, intergovernmental administration, the dynamics of management (decision-making, planning, coordinating, etc.), financial and personnel administration, administrative discretion, and the system of responsibility in a democracy. The seminar work includes use of the case-study technique as developed at Harvard University.

TEXTS: Simon *et al.*, *Public Administration.*
          Hodgetts and Corbett, *Canadian Public Administration.*
          Rowat, *Basic Issues in Public Administration.*

PREREQUISITES: Political Science 100 and preferably a further course in Political Science.

Day and Evening Division: lectures and discussion three hours a week.

Mr. Willms

Summer Session: *Evening Division*:   lectures and discussion five hours a week.

POLITICAL SCIENCE 350. *Elements of Public Law*

Offered in the Department of Public Law as Public Law 350.

FOURTH YEAR: Honours and Graduate

Third year honours students, and majors with the required standing, may with permission of the Department be admitted to these courses.

POLITICAL SCIENCE 400. [525]. *Government of Canada*

A seminar on topics in Canadian government. Reports will be presented and discussed in class on such topics as institutions, procedures, politics, group influences and control agencies.

PREREQUISITE: Permission of the Department.

Evening Division: seminar three hours a week.

Professor MacFarlane

POLITICAL SCIENCE 430. [365]. *Modern Political Thought*

A seminar on the major political ideas of the nineteenth and twentieth centuries, and on some of the currents in intellectual history which have contributed to their development.

PREREQUISITE: Political Science 230, or permission of the Department.

Day and Evening Divisions: seminar three hours a week.

Professor McRae

POLITICAL SCIENCE 440. *Comparative Public Administration*

A comparison of public administration under various systems of government and with other types of administration. Students will not ordinarily take both Political Science 340 and 440.

PREREQUISITE: Political Science 100 and a further course in Political Science.

Day Division: seminar three hours a week.

Professor Rowat

POLITICAL SCIENCE 460. [385]. *International Institutions*

A study of the origins, structure and functioning of modern international institutions, with special emphasis on the League of Nations, the United Nations, and regional co-operation in Europe and the Atlantic community. The major constitutional and political problems of international organization will be considered against the background of world affairs in general.

PREREQUISITE: Political Science 260 or History 380, or permission of the Department.

Day and Evening Division: seminar three hours a week.

POLITICAL SCIENCE 490. [390]. *Tutorial in Political or Administrative Research*

This course, for honours students and for students taking the Diploma in Public Admin-
istration, is designed for training in research techniques and for the discussion and criticism
of honour graduation essays, and other special research projects pursued under the auspices
of the Department in connection with the facilities available in the Public Archives of Canada,
the Library of Parliament, and the government departments.

Day Division: tutorial hours arranged.

Members of the Department

GRADUATE COURSES

Fourth year honours students may, with permission of the Department, be
admitted to these courses.

POLITICAL SCIENCE 500. [550]. *Provincial and Municipal Government*

An advanced course dealing with problems of provincial and municipal government and
administration, and with problems of inter-governmental relations.

Day and Evening Division: seminar three hours a week.

Professors MacFarlane and Rowat

POLITICAL SCIENCE 510. *The Political Process*

An analytic and comparative study of the democratic political process with particular refer-
ence to political parties and elections, pressure groups, public opinion, and political leader-
ship.

Day Division: seminar three hours a week.

Professor Jewett

POLITICAL SCIENCE 540. *Theory and Practice of Administration*

An advanced seminar in which reports will be presented and discussed on specific problems
in public administration. Senior government officials will take part in the seminar from
time to time.

Evening Division: seminar three hours a week.

Professor MacFarlane

POLITICAL SCIENCE 550. *Administrative Law*

Offered in the Department of Public Law as Public Law 550.

POLITICAL SCIENCE 560. [580]. *Canada in World Affairs*

An analysis of Canada's external policy and her role in international affairs with special
emphasis on the period since 1939.

Day and Evening Division: seminar three hours a week.

Professor MacKay

POLITICAL SCIENCE 570. *Soviet Foreign Policy*

A study of selected problems in the pattern of international relations within the Soviet bloc
and the relations between the Soviet Union and the West, with special emphasis on the inter-
relation between ideology and power in the conduct of communist foreign policy.

Day and Evening Division: seminar three hours a week.

Professor Bromke

POLITICAL SCIENCE 590. *Directed Study in a Selected Field*

This course will be conducted as a tutorial (a) for students taking the M.A. degree in Public
Administration who elect to write a research essay rather than a thesis; and (b) for students
taking the M.A. degree in Political Science who wish to undertake specialized research in
an area related to their thesis.

Day Division: hours arranged.

Members of the Department

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See also:

HISTORY 260. *Modern Russia*
HISTORY 380. *An Introduction to the History of International Relations, 1900-1939*
PHILOSOPHY 310. *Social and Political Philosophy*
SOCIOLOGY 250. *Power and Stratification*
SOCIOLOGY 350. *Political Behaviour*
SOCIOLOGY 510. *Political Sociology*

PSYCHOLOGY

Associate Professor; Chairman of tht Department, 1962-63 . R. A. Wendt, M.A.
Associate Professors . F. R. Wake, B.A., Ph.D., M. Nancy Donald, M.A., Ph.D.
Lecturers . Marilyn E. Marshall, M.A., Ph.D., W. E. Walther, M.Sc., Ph.D.
Sessional Lecturers . . . . A. B. Laver, M.A., W. R. N. Blair, Ph.D.
Departmental Assistant . . . . Elinor Burwell, M.A.
Teaching Fellow . . . . M. Norma McDonald, M.A.

In order to complete a degree with a major in Psychology, the student must have credit for the following: Psychology 100, 200, 300; Psychology 205 (or equivalent), and two additional courses in Psychology. Psychology majors are required to complete the Summer Reading Requirement.

The Department of Psychology pursues a policy of integrating classroom work with observation periods, field trips, and research projects within the many and varied institutions in and about the City of Ottawa. Such a policy permits the student to see the importance of theoretical studies to the practical applications in human behaviour.

HONOURS PROGRAM IN PSYCHOLOGY

The honours program in Psychology may be entered from the Honours first year in the Social Sciences (pp. 73-75) or by transfer from the Pass course if 'B' or equivalent standing has been obtained. To maintain honours standing, a student must continue to obtain 'B' standing or the equivalent in the Honours subjects.

Honours requirements are:

1) At least ten courses in Psychology including 100, 200, 205 (or equivalent), 210, 260, 300, 490 (a thesis) and three other 400 or 500 courses selected by the Department.

2) At least three courses in a minor field (ordinarily in Biology, Mathematics, Sociology, Philosophy, Chemistry or Physics, other minors may be permitted).

3) At the end of the Fourth year each candidate will present a thesis based on an experimental investigation. The subject for research will be chosen in consultation with the thesis adviser assigned by the Department. An oral defence of the thesis will be required.

PSYCHOLOGY 100. [210]. *General Psychology*

A survey of psychology. A systematic study of perception, motivation, learning, emotion, and thought. The psychology of individual differences in intelligence, aptitude, and personality. Psychology applied to study habits, careers, and personal adjustment. Contemporary psychological theories. (A student may not obtain credit for both Psychology 100 and 120).

TEXT: To be announced.

Day Division: Annually (lectures three hours a week).

Evening Division: Annually (lectures two hours a week).

Professor Wake and Mr. Laver

PSYCHOLOGY 120. [220]. *Applied Psychology*

The study of application of principles of human behaviour in the fields of industry, business, and government. Designed to be of value to students in engineering, science and other practical professions who may not be able to pursue the study of psychology further. (A student may not obtain credit for both Psychology 100 and 120).

PREREQUISITE: None.

Evening Division: 1962-63 (lectures two hours a week).

Dr. Blair

PSYCHOLOGY 200. [305]. *Experimental Psychology*

An introduction to psychological research, including an examination of methods, theories, and preparation of reports. A number of experiments will be carried out in the laboratory.

TEXT: To be announced.

PREREQUISITE: Psychology 100, which may be taken concurrently; or permission of the Department.

Day Division: Annually (two two-hour laboratory periods a week).

Professor Wendt and Dr. Walther

PSYCHOLOGY 205. *Psychological Statistics*

Descriptive and inferential statistics with application to experimental analysis, problems of test construction and design of experiments in psychology. (A student may not obtain more than one credit for Psychology 205, Economics 220 and Mathematics 255*-256*).

TEXT: To be announced.

PREREQUISITE: Psychology 100 or Sociology 100.

Day Division: 1962-63 (two hours lectures and two hours laboratory period in week).

Dr. Marshall

PSYCHOLOGY 210. [310]. *Social Psychology*

Theoretical and methodological approaches to social psychological problems.

TEXT: To be announced.

PREREQUISITE: Psychology 100 or Sociology 100.

Day Division: *Not offered*, 1962-63.

Evening Division: 1962-63 (three hours a week).

Professor Donald

PSYCHOLOGY 250. [320]. *Child Psychology*

This course traces the growth and development of the child from birth through adolescence. Students will carry out a research project. Field trips will be arranged.

PREREQUISITE: Psychology 100.

Day Division: 1962-63 (lectures three hours a week).

Evening Division: *Not offered*, 1962-63.

Professor Wake

PSYCHOLOGY 260. [370]. *Theory of Personality*

This course deals with theories of personality and considerations of processes of normal and abnormal behaviour. The course introduces techniques of personality evaluation which serve as indicators of normal and abnormal adjustments.

TEXTS: To be announced.

PREREQUISITE: Psychology 100.

Day Division: *Not offered*, 1962-63.

Evening Division: 1962-63 (lectures two hours a week).

Professor Wake

PSYCHOLOGY 300. [390]. *History of Psychology*

The course pursues the growth of psychology as a science. Emphasis is given to the treatment of persisting psychological problems in various theories of the past and the continuing significance of these problems in modern systematic theory.

TEXTS: To be announced.

PREREQUISITE: Psychology 100. Open to Third year students only.

Evening Division: 1962-63 (seminar two hours a week).

Professor Wendt

PSYCHOLOGY 331. [330, 335]. *Foundations of Psychological Testing*

Theoretical foundations for construction, standardization, and application of psychological tests. Survey of types and uses of current test material.

PREREQUISITES: Psychology 100, Psychology 205 (may be taken concurrently).

Day Division: 1962-63 (lectures two hours a week).

Dr. Marshall

PSYCHOLOGY 340. *Personnel Psychology*

Applications of psychological theory and techniques to problems of organizational functioning and worker motivation.

TEXT: To be announced.

PREREQUISITES: Psychology 100. Recommended: Psychology 331.

Day Division: 1962-63 (lectures three hours a week).

Evening Division: *Not offered, 1962-63.*

Professor Donald

PSYCHOLOGY 345. *Personnel Psychology II*

This course considers the contribution of psychology to business, industry, civil service, etc., including labour-management relations, job-analysis, advertising, working conditions, publications.

TEXT: To be announced.

PREREQUISITES: Psychology 100, and Psychology 340 or permission of the Department.

Not offered, 1962-63.

PSYCHOLOGY 380. *Motivation*

A study of motivation in relation to learning, perception and personality development. Both comparative and human data are considered. Contemporary theories of motivation are studied.

TEXT: To be announced.

PREREQUISITES: Psychology 100 and 260.

Day Division: 1962-63 (lectures three hours a week).

Dr. Walther

PSYCHOLOGY 410. *Systematic Psychology*

A treatment of contemporary theory in psychology. Theories of learning, sensation, perception, thinking, personality and emotion are studied in an attempt to integrate these as aspects of general systematic theory.

TEXT: To be announced.

PREREQUISITES: Psychology 100 and 360.

Day Division: 1962-63 (seminar two hours a week).

Professor Wendt

PSYCHOLOGY 420. *Physiological Psychology*

A study of learning, motivation, emotion and perception in terms of the neural structures and processes involved. Contemporary theory and experimental findings in neuro-physiology and their influence on psychology are an important part of this course.

TEXT: To be announced.

PREREQUISITES: Psychology 100, 200, Biology 100, and a course in neurology (or permission of the Department).

Not offered, 1962-63.

PSYCHOLOGY 430. *Psychoanalytic Theory*

A general survey of the contributions of the various psychoanalytic schools. Discussion will be directed toward integration of the basic discoveries of the "classical" analysts with those of the "modern" school. The theoretical validity of psychoanalysis as a diagnostic and therapeutic technique will be evaluated.

TEXT: To be announced.

PREREQUISITES: Psychology 100, 260 and 380.

Not offered, 1962-63.

PSYCHOLOGY 440. *Group Theory and Research*

Contemporary theories concerning the psychological variables underlying interpersonal perception, communication and interaction in small groups and large scale organizations.

TEXT: To be announced.

PREREQUISITES: Psychology 100, 210, and 205.

Day Division: 1962-63 (three hours lecture and discussion a week).

Professor Donald

PSYCHOLOGY 490. *Thesis for Honours in Psychology*

Candidates for honours in psychology will present a thesis, at the end of their fourth year, based on an experimental investigation.

Day Division: Annually (tutorial hours arranged).

Members of the Department

PSYCHOLOGY 505. *Advanced Design of Psychological Experiments*

This course explores the design of experiments through measures of central tendency, correlation, analysis of variance and co-variance, and other advanced techniques. The student will be required to display a well-founded knowledge of the logic basic to research, as well as true competence in computation.

TEXT: To be announced.

PREREQUISITE: B.A. with major in psychology and permission of the Department.

Day Division only, 1962-63.

PSYCHOLOGY 510. *Learning*

This course will cover the historical development of important learning theories. Emphasis will be placed on contributions of each theory to current understanding of human behaviour.

TEXTS: To be announced.

PREREQUISITE: B.A. with major in psychology and permission of the Department.

Day Division only, 1962-63.

PSYCHOLOGY 520. *Perception*

The course in perception will cover the physiological basis of sensation and perception; the philosophical and historical development of perceptual theory in the last five hundred years.

PREREQUISITE: B.A. with major in psychology and permission of the Department.

Day Division only, 1962-63.

PUBLIC ADMINISTRATION

(*See* Political Science)

PUBLIC LAW

Chairman of the Department, 1962-63   .   .   R. O. MacFarlane, M.A., Ph.D.
Sessional Lecturers   .   .   .   .   .   G. F. Henderson, Q.C., B.A.
A. A. Cattanach, Q.C., B.A., LL.B.

PUBLIC LAW 350. [310]. *The Elements of Public Law*

An introduction to the study of law, designed to acquaint the non-lawyer with the principal institutions, concepts, and classifications of the law, with special reference to Canada. (Offered in the Department of Political Science as Political Science 350).

Evening Division: Annually (lectures 2½ hours a week, seminars arranged).

Mr. Henderson

PUBLIC LAW 550. [510]. *Administrative Law*

This course is designed as a study of the field of administrative law in the light of current social and economic problems and relationships and in the light of the trends of modern legislation, with particular reference to Canada. Theories influencing development in the field; delegated legislation and delegated adjudicative power, their nature and extent, reasons for delegation, dangers; judicial and extra-judicial review and control; administrative procedure; suggested reforms. (Offered in the Department of Political Science as Political Science 550).

PREREQUISITE: Public Law 350 or permission of the Department.

Evening Division: Annually (lectures 2½ hours a week, seminars arranged).

Mr. Cattanach

See also History 230, *Canada from 1791*

Political Science 300, *Canadian Federalism*

RELIGION

Associate Professor; Chairman of the Department, 1962-63   L. M. Read, M.A.
Assistant Professor (Department of History)   .   .   .   .   D. G. Bowen, M.A.
Sessional Lecturers   .   .   .   .   Simon L. Eckstein, B.R.E., M.A.
                                                       Frank H. Morgan, B.A., B.D.

The general purpose of courses offered in this department is to promote a sensitive and intellectually mature understanding of the basic ideas and concerns of outstanding religious leaders and movements, primarily in the Judaeo-Christian tradition, irrespective of whether these coincide or conflict with individual convictions. Religious writings are studied critically in an attempt to understand their meaning, to grapple with their problems, and to assess their significance both in their original cultural context and for our own situation.

As general introduction, students are advised to take Religion 100 or 120 or both. If two or more courses are taken in the department, students are advised to make Religion 120 one of these. In 1962-63 other courses may be taken without previous work in the department.

RELIGION 100. [215]. *Introduction to World Religions*

A survey of eastern religions: Hinduism, Buddhism, Taoism, Confucianism and Shinto. A survey of "western" religions: Zoroastrianism, Judaism and Christianity (brief review of major emphases only) and Islam. Some aspects of primitive religions and the religions of the ancient Near-East, Greece and Rome. Representative sociological, psychological and philosophical theories of the character of religion. (Course credits cannot be obtained for both Religion 320, taken in 1960-61 or earlier, and Religion 110).

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: 1962-63 (lectures two hours a week).

Professor Read

RELIGION 120. [220]. *Introduction to the Bible*

This course will survey the historical background, formation of the literature, and main teachings of the Bible. Text, Canon and translations. The history of Israel and develop- ment of Hebrew literature; the major concepts of Hebrew religion; the great prophets; the inter-testamental period. Jewish sects and literature in the New Testament times, including apocalyptic writings and the Dead Sea Scrolls; Hellenistic religion; the contribution of Source and Form Criticism to the interpretation of the Synoptic Gospels; the teaching of Jesus; letters and teaching of Paul; the Johannine writings; the book of Revelation.

Day Division: Annually (lectures and discussion three hours a week).

Mr. Morgan

RELIGION 210. [310]. *History of the Church and Christian Thought*

The course will survey the influence of the Church in Western society from its beginning to the present day and will be concerned with both the history of the Church as an institution and the development of Christian thought. (The course is listed also as History 210).

Day Division: 1962-63 (lectures and discussion three hours a week).

RELIGION 225. [340]. *Records of the Life of Jesus*

The course will be concerned with a systematic, critical, and appreciative study of the available records of the life of Jesus. Class periods will be mainly taken up with free class discussions of successive sections of the records making use of H. B. Sharman's **Records of the Life of Jesus** (containing the synoptic gospels, Matthew, Mark and Luke, in parallel form and the gospel of John with cross references). There will be accompanying lectures and readings on the historical context of the life of Jesus and on the historical context in which the records appeared.

Evening Division: 1962-63 (three hours a week).

Professor Read

RELIGION 240. [330]. *Judaism and the Jewish People*

The first half of the course will survey the history of Judaism and the Jewish People from earliest times to the present day emphasizing the major factors, both external and internal, influencing their development. The Biblical period; prophecy; the second commonwealth; the Talmudic era; the golden age in Spain; the medieval Jewish community; the modern period; Zionism; the contemporary scene. The second half of the course will review the basic beliefs and practices of Judaism. The thirteen principles of Maimonides; the Synagogue, its rituals and practices; the Jewish home and family; the Jewish holy days, fasts and festivals; dietary laws; marriage and divorce laws; mourning customs; problems, trends and movements in contemporary Judaism. (Course credit cannot be obtained for both Religion 210, if taken in 1960-61 or earlier, and Religion 240.)

TEXTS: M. Margolis and A. Marx — *A History of the Jewish People*
        Isidore Epstein — *Judaism*
    Evening Division: 1962-63 (lectures two hours a week).

Mr. Eckstein

RELIGION 300. [350]. *Philosophy and Religion*

(Offered in the Department of Philosophy as Philosophy 300).

RELIGION 330. [370]. *Christian Ethics and Society*

The ethical teachings of Biblical Judaism, Jesus and the early church, and major types of interpretation of Christian ethics. A number of problems of principle will be studied in detail, for example, law and love, agape and eros, the freedom of man and the sovereignty of God; and a number of problems of social responsibility, for example, nationalism and war, democracy and dictatorship, Christianity and the rise of capitalism, Christianity and communism.

Not offered, 1962-63.

RELIGION 350. [390]. *Seminar*: *The Nature and Destiny of Man*

With the participation of members of faculty from the sciences, social sciences, and humanities as well as religion, a critical examination will be made of present and potential contributions of the various disciplines either in conclusions or methodology to an understanding of the nature of man himself and his appropriate destiny.

PREREQUISITE: Recommendation of a participating member of faculty.

Not offered, 1962-63.

RELIGION 360. *Selected Problems in Interpretation*

A course conducted either on a tutorial or seminar basis designed to enable advanced students to pursue interests in selected areas of religion.

PREREQUISITE: Permission of the Department.

    Day and Evening Divisions: 1962-63 (hours to be arranged).

Professor Read

RUSSIAN

Lecturers . . . . J. G. Garrard, B.A.
(on leave of absence, 1962-63)
John E. R. Lloyd, B.A.
Special Lecturer, and language laboratory instructor . E. Stichling, Dip.Phil.
Sessional Lecturers . . . . . . G. Belkov, M.A., H. Frisch, Ph.D.
Sessional Lecturer (Honorary) . . . . D. Lalkow, M.D.

LANGUAGE REQUIREMENT

Students in the Division of Humanities and Social Sciences may fulfil the language requirement by taking Russian 100. Students in the Division of Science may fulfil the language requirement by taking Russian 110. Note that both these courses have a prerequisite, Russian 15, for those students entering with little or no previous knowledge of the language. Entering students with two or more years of secondary school Russian may take Russian 100, or 110.

Students may elect Russian as a minor subject in combination with a suitable major subject, with the approval of the department concerned. A minor in Russian consists of Russian 100, either 200 or 210 and 220, and 310.

MAJOR PROGRAM

Students may elect Russian as their major, alone or in combination with a suitable minor subject. A major in Russian consists of a minimum of five courses, excluding Russian 15, plus an oral examination in Russian which is held towards the end of the student's Third year.

HONOURS PROGRAM

The combined honours program in German and Russian is designed to meet the needs of those students who wish to teach or go on to graduate work in either language. It consists of a minimum of seven courses in each discipline. An oral examination in Russian is held towards the end of the student's Fourth year. For the general regulations governing honours courses, see pp. 73-75. For the course requirements in German, see p. 138.

LANGUAGE LABORATORY

The University's language laboratory provides facilities for drill in aural-oral comprehension. Students may register for extra practice periods in open hours. The language laboratory is used in the following courses: Russian 15, 100, 200, 220. Oral examinations are given in these courses.

RUSSIAN 15. [115]. *Elementary Russian*

Introductory course, the aim of which is to ensure an adequate grasp of the mechanics of the language and basic skill in aural-oral comprehension. Reading of simplified texts and oral practice in the language laboratory.

Day and Evening Divisions: Annually (four hours a week).
Summer Session: 1962 (five hours a week).

Members of the Department

RUSSIAN 100. *Intermediate Russian* (Arts section)

Grammar review; composition; oral drill in the language laboratory. Reading of selected poetry and prose.

PREREQUISITE: Russian 15, or the equivalent.

Day and Evening Divisions: Annually (four hours a week).

Members of the Department

RUSSIAN 110. *Intermediate Russian* (Science section)

Reading of representative material from Soviet Russian technical and scientific journals. This course is designed to train students in the Division of Science to keep up to date with Russian advances in their respective fields.

PREREQUISITE: Russian 15, or the equivalent.

Day or Evening Division: 1962-63 (three hours a week).

Dr. Frisch

RUSSIAN 200. *Composition and Conversation*

Technique of translation into Russian. Free composition in Russian. Oral drill in the language laboratory.

PREREQUISITE: Russian 100.

Day or Evening Division: 1962-63 (three hours a week).

RUSSIAN 210*. *The Civilization of Russia*

This course is designed to give an adequate cultural and historical background. It consists in the main of a survey of Russian achievements in the arts of painting, architecture, music and literature from the period of Kiev Rus to the present day. (Half course).

PREREQUISITE: Russian 100, or permission of the instructor.

Day or Evening Division: 1962-63 (one hour a week, *both* terms).

RUSSIAN 220*. *Introduction to Russian Drama*
> The drama in Russia from Fonvizin to Chekhov.   Introductory lectures followed by reading of representative texts.   Oral drill in the language laboratory.
>
> PREREQUISITE: Russian 100, or permission of the instructor.
>
> *Day or Evening Division*:   1962-63   (three hours a week, *second* term).

RUSSIAN 310. *Nineteenth Century Literature*
> Some attention is paid to the classical and pre-romantic periods and also to developments since 1900, but the emphasis is on poetry and prose from Pushkin to the death of Chekhov.
>
> *Not offered*, 1962-63.

RUSSIAN 320. *The Golden Age*
> Russian poetry from the earliest times to the present day, with special emphasis on the works of Pushkin and Lermontov.
>
> *Not offered*, 1962-63.

RUSSIAN 330*. *Soviet Russian Literature*
> Literature since 1917, with special emphasis on the novel and short story.
>
> *Not offered*, 1962-63.

RUSSIAN 410. *The Russian Novel*
> The rise of the novel in the first half of the nineteenth century and its development since that time.
>
> *Not offered*, 1962-63.

RUSSIAN 490. [390]. *Special Subject*
> A general knowledge of the life and works of one of the following: Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Leo Tolstoy, Chekhov, Gorky.   Library facilities permitting, another author or a topic of literature may be elected.
>
> *Not offered*, 1962-63.

See also Economics 470, Geography 360, History 260, Political Science 320.

SOCIOLOGY

Associate Professor; Chairman of the Department, 1962-63

	Muni C. Frumhartz, A.M.
Associate Professor	J. A. Porter, B.Sc. (Econ.)
Assistant Professors	Hyman Burshtyn, M.A.
	Bruce A. McFarlane, M.A., Ph.D.
	Peter C. Pineo, M.A., Ph.D.
Sessional Lecturers	T. F. S. McFeat, B.A., Ph.D.
	Marcel Rioux, M.A., Dip.Eth.
	Enid White, B.Sc., (Econ.)

Students who wish to major or to take Honours in Sociology are expected to fulfil the summer reading requirements at the beginning of their Second year.

A student who took Sociology 220 in previous years may substitute it for Sociology 100 as an introduction to the discipline and as a prerequisite for advanced courses.

PASS COURSE

Students who major in Sociology are normally required to take at least six courses in the major field. These include Sociology 100, 200 and 300, which are most appropriately taken in the First, Second and Third years, respectively, and at least one additional course at each of the 200 and 300 levels. The course program is to be worked out in consultation with the Chairman of the Department. It is expected that some work will be taken in related disciplines, the most important of which are: Economics, Geography, History, Political Science, and Psychology.

HONOURS COURSES

Honours programs may be entered from the Honours First year in the Social Sciences (see pp. 73-75) or by transfer from the Pass course if second-class standing has been obtained. Students taking honours in Sociology are expected to meet the general University regulations governing the degree and to fulfil certain additional requirements depending upon the program selected. The following programs are available:

Sociology. The entire selection of courses is to be worked out in close consultation with the Chairman of the Department and is subject to his approval. Normally, the requirements consist of:

1. Ten courses in Sociology, including:
   a. Sociology 100, 200, 205, 300 and 470
   b. At least one of Sociology 220 and 320
   c. Four additional courses, at least two of which are at the 300 level
2. A minor, consisting of three courses in one of the allied social sciences (Economics, History, Political Science or Psychology).
3. A comprehensive examination at the end of the final year.

Sociology and Political Science. Students intending to enter this program should take Political Science 100 or Sociology 100 (preferably both) in the First year. The choice of courses in subsequent years is subject to the approval of the chairmen of the two departments. Normally, the requirements consist of:

1. At least six courses in each of the two disciplines, including:
   a. Political Science: 100, one of 230 or 430, and three of 210, 220, 300, 310 and 320
   b. Sociology: 100 and 200, and three of 245, 250, 300, 320, 340 and 350
   c. Political Science 490 or Sociology 470 in the final year.
2. A comprehensive examination at the end of the final year.

The program will be so arranged that the student may transfer to full honours in either of the two fields at the end of the Third year, if he then wishes to specialize more intensively.

Consideration will also be given to applications for Combined Honours in Sociology and Economics or in Sociology and another related discipline.

Honours and combined honours students will not be required to write final-year examinations in their sociology courses.

GRADUATE STUDIES

The Department of Sociology offers studies leading to the degree of Master of Arts. A student wishing to enter the M.A. program must have an Honours degree in Sociology or its equivalent. Otherwise, he will ordinarily be expected to take a qualifying year (of five courses designated by the Department) before being admitted to M.A. candidacy.

A candidate for the M.A. in Sociology will (1) take three graduate seminars within the Department, (2) write comprehensive examinations in the general field of Sociology, (3) present a thesis, and (4) defend his thesis at an oral examination. Grades of B or better must be obtained in all of these. Normally, the student will also be required to have had training — or, in some other way, to demonstrate his competence — in social research and in statistics before completing his program. He will, in addition, be expected to have a reading knowledge of a foreign language approved by the Department.

The general regulations governing graduate studies are set out on pp. 76-78 of this Calendar.

SOCIOLOGY 100. [210]. *Introduction to Sociology*

An introduction to the basic principles and concepts of sociological study. An examination of the elements of social structure and of social behaviour — social relations, social groups, cultural norms and values, and institutions — against the background of both simple and complex societies.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: Annually (lectures and discussion three hours a week).

Summer Session: 1962   (lectures and discussion five hours a week).

Members of the Department

SOCIOLOGY 200. [362]. *Social Research*

Lectures, seminars, and exercises dealing with sociological method and, more particularly, with the techniques of social research. Special attention is paid to sampling, questionnaires and interviews, observational techniques, sociometry, personal documents, and content analysis. During the course the student will apply these techniques to some specific research project of his own.

PREREQUISITE: Sociology 100 or permission of the instructors.

Day and Evening Divisions: 1962-63   (lectures and seminars two hours a week).

Professors Burshtyn and Pineo

SOCIOLOGY 205. [355]. *Statistics*

(This course may be taken either as Economics 220 or as Psychology 305).

SOCIOLOGY 210. [310]. *Social Psychology*

(Offered in the Department of Psychology as Psychology 210).

SOCIOLOGY 220. [320]. *Cultural Anthropology*

This course deals mainly with the characteristics of human nature, the development and differentiation of human culture, theories relating to culture, society and personality, kinship, language, art, value systems and cultural dynamics.

PREREQUISITE: Sociology 100 or permission of the instructor.

Day Division: *Not offered*, 1962-63.

Evening Division: 1962-63   (lectures and discussion two hours a week).

Dr. McFeat

SOCIOLOGY 240. [370]. *The Primary Group*

An examination of small face-to-face groups and their relationship to the social structure of the larger society. Particular attention will be paid to the family, children's play groups, juvenile gangs, and the industrial working group.

PREREQUISITE: Sociology 100 or permission of the instructor.

Day Division: 1962-63   (lectures and discussion three hours a week).

Evening Division: *Not offered*, 1962-63.

Professor Pineo

SOCIOLOGY 245. [366]. *Sociology of Work*

A study of the sociological aspects of work in contemporary society, with attention also to comparative analysis and historical trends: the social organization of modern industry and business, sociological analysis of selected occupations, and the relation between occupational activities and organizations and their social and institutional setting.

PREREQUISITE: Sociology 100 or permission of the instructor.

Not offered, 1962-63.

Sociology 250. [368]. *Power and Stratification*

The relationships among political, economic and social power. The theories of Marx, Weber, Pareto and Mosca. Elites, oligarchies and ruling minorities. Bureaucracy and social power. Myths and the psychology of social movements. Criteria of social class. Social class and behaviour. Social mobility. Class, caste and ideology.

PREREQUISITE: Sociology 100 or permission of the instructor.

Day Division: 1962-63 (lectures and discussion three hours a week).

Evening Division: *Not offered*, 1962-63.

Professor Porter

Sociology 300. [400]. *Sociological Theory*

A survey of the rise of modern Sociology and of the history of sociological theory, with special reference to the contributions of Marx, Durkheim, Pareto, Weber and Parsons. The latter part of the course also includes an examination of sociological concepts and of selected portions of systematic theory.

PREREQUISITES: Sociology 100 and Third-year standing.

Day Division: 1962-63 (seminar three hours a week).

Evening Division: *Not offered*, 1962-63.

Professor Frumhartz

Sociology 310. [375]. *Sociology of Deviance*

An analysis of the relation of deviant behaviour to the functioning of social systems: conditions and types of deviance from the institutional order, the evasion of rules, the social roles of deviants, the structure of control, punishment and cure.

PREREQUISITE: Sociology 100 or permission of the instructor.

Day Division: *Not offered*, 1962-63.

Evening Division: 1962-63 (lectures and discussion two hours a week).

Professor Burshtyn

Sociology 320. [345]. *The Ethnography of French Canada*

A course designed to present an anthropological analysis of the French Canadian way of life including major elements such as politics, religion, social structure, cultural values and literature. This ethnic group will be considered both in its historical development and present situation with the aim of understanding it from a global point of view.

PREREQUISITE: Sociology 100 or permission of the instructor.

Day and Evening Divisions: 1962-63 (weekly seminar).

Professor Rioux

Sociology 340. [367]. *Complex Social Systems*

A study of the structure and dynamics of complex societies and of their component organizational systems. The first part of the course examines modern urban, industrial society in its associational, mass, and totalitarian modes. The second part is primarily concerned with the formal structure and bureaucratic organization of industry and work, the labour movement, government and politics, education and leisure.

PREREQUISITE: Sociology 100 or permission of the instructor.

Not offered, 1962-63.

Professor Frumhartz

Sociology 350. [364]. *Political Behaviour*

An examination of sociological contributions to the study of political behaviour and of the relations between politics and the social structure. The areas of primary interest include: the determinants and role of public opinion, voting and other forms of political participation, the politically relevant aspects of the media of mass communication, and the structure and functions of social and political movements.

PREREQUISITE: Sociology 100 or permission of the instructor.

Not offered, 1962-63.

SOCIOLOGY 360. [335]. *Social and Cultural Change*

An examination of the conditions which make for changes in social systems. Biological, demographic, economic, technological and socio-cultural factors will be considered. Social evolution and differentiation, culture contact, and theories of historical development. The idea of progress.

PREREQUISITE: Sociology 100 or permission of the instructor.

Day Division: 1962-63 (lectures and discussion three hours a week).
Evening Division: *Not offered*, 1962-63.

Professor McFarlane

SOCIOLOGY 370. [450]. *Tutorial in Sociology or Anthropology*

A course designed to permit a student to pursue his interests in a particular area of Sociology or Anthropology. The student will prepare papers as the basis for discussions with his tutor.

PREREQUISITES: Sociology 100, Third-year standing and permission of the Chairman of the Department.

Day and Evening Divisions: Annually (tutorial hours arranged).

Members of the Department

SOCIOLOGY 470. [490]. *Honours Thesis*

At the end of the final year an Honours candidate will be required to present a major essay based upon a supervised research project. The subject for research will be arranged early in the year in consultation with the Department and an advisor will be assigned. The student will be orally examined upon his thesis after its submission.

PREREQUISITE: Final-year Honours candidacy.

Day Division: Annually (tutorial hours arranged).

Members of the Department

GRADUATE SEMINARS

SOCIOLOGY 500. *Sociological Theory*

Analysis of selected problems from the standpoint of systematic sociological theory.

Day and Evening Divisions: 1962-63.

Professors Burshtyn and Pineo

SOCIOLOGY 510. *Political Sociology*

An examination of the sociological dimensions of power, politics, and political behaviour.

Day and Evening Divisions: 1962-63.

Professors Frumhartz and Porter

SOCIOLOGY 520. *Comparative Social Systems*

Comparative analysis of selected features of Canadian, British and American social structure.

Day and Evening Divisions: 1962-63.

Members of the Department

SPANISH

Assistant Professor . . . . Jeremy C. Forster, M.A.
Special Lecturer . . . . Francisco Atienza, B.T., Lic.T., Lic.J.C., D.J.C.
Lecturer . . . . (to be appointed)

Students wishing to major in Spanish or to combine Spanish with another subject for their major should consult the Department for guidance on courses and summer reading. Such students will normally be required to include Spanish 200 and 390 in their degree program.

All students are encouraged to make the fullest use of the language laboratory facilities in their own time.

SPANISH 15. [115]. *Introductory Spanish*

A course designed to give a sound basic knowledge of the language. The fundamentals of grammar will be covered, with the emphasis on idiomatic, spoken Spanish. Reading in the second half of the course is designed to create fluency and confidence and to build up vocabulary. Tapes will be available for laboratory work.
Select groups, chosen on merit early in the year in both day and evening divisions, will move ahead faster and be required to cover more ground than the others. Further promotion to select groups or demotion from them may be made throughout the year.

Day and Evening Divisions: Annually (lectures and laboratory four hours a week).

Members of the Department

SPANISH 100. [205]. *Intermediate Spanish*

A course designed to consolidate and supplement knowledge of the language acquired in the first course, to teach the correct writing of Spanish, to give conversational practice, and to introduce aspects of Spanish culture through selected readings.
Select groups will be formed after the pattern in Spanish 15. Students will be selected for these groups in the first instance on the basis of their final grade in Spanish 15.

PREREQUISITE: Spanish 15 or equivalent.

Day and Evening Divisions: Annually (lectures three hours a week).

Members of the Department

SPANISH 200. [300]. *The Civilization of Spain*

A survey of Spanish history and culture, with extensive readings from Spanish literature. This course is a requisite for students majoring in Spanish.

PREREQUISITE: Spanish 100 or permission of the Department.

Day or Evening Division: 1962-63 (meetings to be arranged).

Mr. Forster

SPANISH 205. [350]. *The Civilization of Spanish America*

An introduction to the history and culture of Spanish America, with reading of selected authors.

PREREQUISITE: Spanish 100 or permission of the Department.

Not offered, 1962-63.

SPANISH 220. [330]. *The Early Golden Age*

Spanish literature from "La Celestina" to Cervantes.

PREREQUISITE: Spanish 100 or permission of the Department.

Day or Evening Division: 1962-63 (meetings to be arranged).

SPANISH 225. [330]. *The Later Golden Age*

Spanish literature after Cervantes to the end of the Baroque period.

PREREQUISITE: Spanish 100 or permission of the Department.

Not offered, 1962-63.

SPANISH 240. *Modern Spanish Literature*

Spanish literature of the Nineteenth and Twentieth Centuries.

PREREQUISITE: Spanish 100 or permission of the Department.

Not offered, 1962-63.

SPANISH 310. [310, 324]. *Early Spanish Language and Literature*

A study of the origins and development of the Spanish language with a survey of Castilian literature from the Poema de Mio Cid to the period of the Catholic Monarchs.

PREREQUISITE: Spanish 200 or permission of the Department.

Day or Evening Division: 1962-63 (meetings to be arranged).

Dr. Atienza

SPANISH 325. [341]. *Cervantes*
  A study of Cervantes and his age with particular reference to "Don Quijote".
  PREREQUISITE: Spanish 200 or permission of the Department.
      Not offered, 1962-63.

SPANISH 340. [344].   *The Modern Spanish Novel*
  The Spanish novel from "La Gaviota" to the present.
  PREREQUISITE: Spanish 200 or permission of the Department.
      Not offered, 1962-63.

SPANISH 345. [336].   *Modern Spanish Poetry*
  Spanish poetry from Bécquer to the present.
  PREREQUISITE: Spanish 200 or permission of the Department.
      Not offered, 1962-63.

SPANISH 390. *Seminar*
  A course designed for students majoring in Spanish. It will normally be taken in the student's last year. A topic will be selected in consultation with the Department for individual study and research on a tutorial basis.

  Topics previously selected:
    Federico García Lorca [338].
    Unamuno and Existentialism in Spain [385].

FINANCIAL AID FOR STUDENTS

INDEX TO SCHOLARSHIPS, PRIZES, BURSARIES AND LOANS

SCHOLARSHIPS

PRIZES

MEDALS

BURSARIES

LOAN FUNDS

FINANCIAL AID FOR STUDENTS
SCHOLARSHIPS, PRIZES, BURSARIES, AND LOANS

1. The University welcomes the offer of scholarships, prizes, medals, and bursaries. The Registrar will be glad to send, on request, information as to the functions of scholarships and bursaries, and also a statement of particular needs at present in the financial aid program of the University.

2. Scholarships, prizes, medals, bursaries, and loan funds may be accepted from donors at the discretion of Senate on appropriate recommendation of the President. Awards of scholarships, prizes, and medals will be made by Senate to qualified candidates of merit; but the Senate may withhold any such award if no candidates of merit present themselves. The award of scholarships, prizes, and medals shall be final when formally announced by the University.

3. The standing of students being considered for any such awards shall be determined on the basis of courses taken for credit and shall not take account of extra courses being taken for no credit.

4. (a) No limitation shall be placed upon the number of prizes and medals which any one student may win in any one year. (b) A student may be declared the winner of as many scholarships as he may win as a qualified candidate of merit but, in the case of awards carrying a major financial amount, such student will normally receive the proceeds only of the largest among these major amounts. (c) Winners of scholarships and prizes may resign the monetary value but retain the honour of such awards, and their names will be published as winners. In cases arising under 4(b) or 4(c), the monetary amounts so relinquished may be awarded *by reversion* if merited.

5. A scholarship application will not be considered if the candidate has also applied for entrance scholarships at other universities.

6. Scholars who hold continuing scholarships at Carleton University must maintain a level of academic performance each year satisfactory to the Scholarships Committee, or relinquish their scholarships.

7. Undergraduate scholarships and bursaries of $200 or more which are under the jurisdiction of the University will ordinarily be paid in two instalments, one in October and one in January. The University reserves the right to withhold the payment of the second instalment if the attendance or conduct of the student is not satisfactory. Awards of less than $200 will ordinarily be paid in one instalment, in October.

8. The University does not guarantee the award of any scholarship, prize, medal, or bursary other than those created from funds of the University. Those awards based upon gifts of individuals or associations other than the University will be forwarded only after the funds required have actually been received from the donors.

9. One application form only is required for all entrance scholarships listed under Scholarships.

SCHOLARSHIPS

I. UNDERGRADUATE SCHOLARSHIPS TENABLE AT CARLETON UNIVERSITY

Henry Marshall Tory Scholarships

Two entrance scholarships, of a total maximum value of $2000 each ($500 a year for a maximum of four years) have been established by the University, for open competition among students entering Carleton University at either senior or junior matriculation level.

Established 1961, and named to commemorate the first president of Carleton University, Dr. Henry Marshall Tory.

University Entrance Scholarships

Six entrance scholarships, of a total maximum value of $1200 each ($300 a year for a maximum of four years) have been established by the University for competition among students entering the First year of Arts, Journalism, Commerce, Science, or Engineering from the following collegiate institutes or high schools of the city of Ottawa: Lisgar, Glebe, Fisher Park, Nepean, Technical, Laurentian, Rideau, and Ridgemont, as well as from the secondary schools of the Ontario counties adjacent to the city.

These six University Entrance scholarships, together with the four Mercy Neal Southam Entrance scholarships (described immediately below) will constitute each year ten scholarship awards to be granted on the following basis: one scholarship to the applicant with highest standing from each of the eight Ottawa schools cited; one scholarship to be available for competition among able students from the secondary schools of Renfrew, Prescott, Glengarry, Stormont, Dundas, Grenville, and Leeds; and one other University scholarship offered for general competition among the city and county schools. The order of award among the schools will be on merit; and in the case of any school where it happens in a given year that none of the candidates nominated qualifies, the University reserves the right to allot the scholarship elsewhere.

Candidates from the secondary schools must write at least *six* Ontario Grade XIII final examination papers in the year of application and will be judged on their *eight* best papers.

Mercy Neal Southam Entrance Scholarships

Four $500 scholarships will be awarded annually, if merited, to students entering the First year of Arts, Journalism, Commerce, Science, or Engineering at Carleton University.

The conditions of award and administration of the Mercy Neal Southam Entrance scholarships will be the same as those governing the University Entrance Scholarships (described immediately above) except that each scholarship will be payable in two successive annual instalments of $250, subject to scholarly performance.

Established in 1949 under the terms of bequest of the late Wilson Mills Southam, the scholarships are in memory of his grandmother, Mercy Neal Southam.

Union Carbide Canada Ltd. Undergraduate Scholarships

Tenable for four years, each Union Carbide scholarship has a maximum value of $2500, payable $700 the first year and $600 in each subsequent year. Should the academic course be of less than four years duration, the scholarship will terminate with graduation. It may also be terminated at any time if the student fails to meet the requirements of the University. Two Union Carbide scholars are maintained in attendance at Carleton University.

Awarded to male graduates of secondary schools who (1) have good scholastic standing and personal reputation and are recommended by their school authorities; (2) will be enrolling in an Engineering, Physical Sciences, Commerce or Business Administration course, with a view to entering business, industry or the field of education upon graduation; (3) possess superior talent and ability (financial need is important but not paramount); (4) do not receive scholarship awards from other sources exceeding $200 in one year. Two Scholarships will be available for 1962.

Donor: Union Carbide Canada Limited. Established 1954.

The Ottawa Citizen Scholarship

A scholarship valued at $900 will be awarded annually, if merited, to a student entering Carleton University from a high school in any one of the following counties in the Ottawa district: nine in Ontario — Carleton, Dundas, Glengarry, Grenville, Lanark, Prescott, Renfrew, Russell and Stormont — and four in Quebec — Gatineau, Hull, Papineau and Pontiac.

Candidates with junior or senior matriculation may apply for admission to Qualifying University or First year of Arts, Commerce, Journalism or Science.

Candidates with senior matriculation may apply for admission to Engineering.

A student admitted with junior matriculation standing will receive $225 per year for a period of four years; a student admitted with senior matriculation standing will receive $300 per year for a period of three years; always provided that, in both cases, the student is registered as a regular full-time student of Carleton University and maintains a satisfactory academic standing.

A candidate for this scholarship must present evidence of high scholastic attainment, together with a record of outstanding participation in the extra-curricular activities of his school.

Donor: The Ottawa Citizen. Established 1955.

Ottawa Business and Professional Women's Club Scholarship

Value $200. Awarded annually to a girl entering Carleton University with high matriculation standing from one of the Ottawa collegiates and high schools. Donor: Ottawa Business and Professional Women's Club. Established 1946.

School of Public Administration Scholarship

Value $500. Awarded, preferably to a public servant, for full-time study toward the Certificate in Public Service Studies. For details regarding application, see p. 197.

Regional Entrance Scholarships

Value $1600 each. Four are awarded annually, if merited, on the basis of outstanding achievement in secondary school studies, to students entering Carleton University with junior or senior matriculation standing on the following distribution:

(a) Two scholarships available for Ontario (except the city of Ottawa), and the Western Provinces and Territories.

(b) Two scholarships available for Quebec Province and the Maritime Provinces.

Each scholarship winner will have $400 applied to the cost of tuition at the time of registration in his first year at Carleton University, and, if he is still in attendance and making progress satisfactory to the Scholarships Committee, $400 at the time of registration in each succeeding year, not exceeding four years in all.

These scholarships were established by the University in 1952.

International Nickel Company Scholarship

One entrance scholarship has been established by The International Nickel Company of Canada, Limited, restricted to study in the fields of engineering, geology, geophysics, mathematics and physics. The scholarship covers tuition fees, a grant of $300.00 to the student, as well as a cost-of-education supplement of $500.00 to the University. The maximum award for a scholarship is $1,200.00. Any graduate of a high school or the equivalent, or any student in his final high school year, who has good scholastic standing and personal reputation, is eligible to apply. It is awarded by the University Scholarships Committee on the basis of the applicant's record, character, and financial need. The scholarship is renewable annually to the student for a maximum of three additional academic years or, in certain cases, until graduation, whichever is the shorter period. Further details from the Registrar.

Donor: The International Nickel Company of Canada, Limited. Established 1956.

W. Sparks & Son Ltd., Entrance Scholarship

Value $500.00. Awarded annually to an entering student of superior scholarship who is the child of a Canadian Government employee serving outside Canada; or who has served overseas immediately prior to the application of his child, or who will be serving overseas in the future immediately following such application.

Donor: W. Sparks & Son Ltd., Ottawa. Established 1960.

E. B. Eddy Company Continuing Scholarships

Two scholarships each of value $600 a year until graduation. Each scholarship is open to a graduate, preferably male, of a Canadian secondary school, who has high scholastic standing in his senior matriculation examinations. Each scholarship is awarded by the University and retained, if merited, until graduation, at which time the next E. B. Eddy Scholar will be named. New scholars will be named in 1963.

Donor: The E. B. Eddy Company. Established 1959.

Parfield Oils Ltd., Scholarships

Three scholarships, of total value $1200 annually, have been established by Parfield Oils (1952) Limited for competition among students entering Carleton University or undergraduates of the University. In addition, a sustaining fund of $800 annually has been provided to help defray the cost to the University of educating the winning scholars.

The scholarship awards are:

1. One entrance scholarship of value $600 to be awarded annually, if merited, to a student entering Carleton University with high standing in the senior matriculation examinations.
2. Two scholarships of value $300 each, to be awarded annually to an outstanding student progressing from one year of course to another in Carleton University.

Donor: Parfield Oils (1952) Limited, Ottawa, Canada. Established 1959.

Association of Professional Engineers' Entrance Scholarships

(1) Value $500. Awarded annually to a Grade XIII student of high proficiency who is entering the engineering course.

(2) Value $250. Awarded annually to an engineering student of high proficiency proceeding from one year of course to another in Carleton University.

Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961.

James H. Rattray Memorial Scholarships

Value $200 each. Two scholarships awarded annually to a student entering first year Engineering at Carleton University.

Donor: The late James H. Rattray, M.C. Established 1961.

Carleton Alumni Association Scholarships

Scholarships totalling $4,000 have been provided for 1962-63 for undergraduates passing from one year of course to another at Carleton University with high standing. Certain of the scholarships are reserved for students in honours.

Donor: The Carleton University Alumni Association.

Maxwell MacOdrum Scholarships

Four scholarships, of a value of $400 each, have been provided by the University for annual competition among undergraduates in the various disciplines. Each scholarship will be awarded on a basis of outstanding performance, and will be retainable for one year.

The scholarships are named in memory of Dr. Maxwell MacOdrum, second president of Carleton University. Established 1961.

Lord Dundonald Chapter (I.O.D.E.) Scholarship

Value $100. Awarded annually to a student of superior standing and general proficiency, entering the final year of a degree course at Carleton University.

Donor: Lord Dundonald Chapter, I.O.D.E. Established 1956.

Ottawa Women's Canadian Club War Memorial Scholarship

Value approximately $100.00. Awarded annually to a student progressing from Qualifying University year to First year in Carleton University. Preference is given to veterans or their children. Endowed 1946.

Clendinnen Scholarship in Biology

Value $100. Awarded annually to an outstanding student proceeding from the Third to the Fourth year of the honours course in biology at Carleton University. Established 1951, in memory of Mr. and Mrs. T. E. Clendinnen, by their daughter.

Canadian Club of Ottawa Scholarship

Value $200. To foster interest in public affairs, Canadian citizenship and Canadian history, this award is presented annually to a student entering the final year of a degree course who has shown outstanding promise in studies and work relating to national development in Arts and Letters, Humanities and the Social Sciences. Donor: The Canadian Club of Ottawa. Established 1952.

Gavin Scott Macfarlane Memorial Scholarship
Value $200. To be awarded in 1962-63 to an outstanding student, preferably in honours, who is proceeding from one year of course to another in Carleton University.

First donated 1957, by Mrs. G. S. Macfarlane in memory of her husband, Lieutenant-Colonel Gavin Scott Macfarlane.

Ottawa Woman's Club Scholarship
Value $100. Awarded annually to an outstanding woman student progressing from one year of course to another in Carleton University. Donor: The Ottawa Woman's Club.   Established 1952.

University Women's Club of Ottawa Scholarship
Value $100. Awarded annually to a deserving woman student progressing from one year to another.   Established 1952, in honour of Dr. Alice E. Wilson, by The University Women's Club of Ottawa.

N.F.C.U.S. Interregional Study Exchange Plan
Since 1952, Carleton University has participated in the Interregional Study Exchange Plan sponsored by the National Federation of Canadian University Students.

Each year, six students from universities other than English-language institutions of Ontario and Quebec may be granted free tuition at Carleton for the studies of their penultimate year.   Two Carleton students may be chosen from among those who apply for permission to study, tuition free, at French-language universities in Quebec, or universities of the west coast, the prairies or the Maritimes.

Carleton students wishing to apply for participation in the plan should consult the Registrar before January 31.   Selection will be made by a committee composed of the Dean of the Faculty of Arts and Science, the Registrar, the President of the Students' Council, and the External Affairs Chairman of the Students' Council. All applications will be subject to the approval of the host university.

Jean MacOdrum Memorial Scholarship (Hleodor Society)
Value $100. Awarded annually, if merited, to a woman who is a full-time undergraduate proceeding to the final year of a degree course, who has a better than average academic record, and who has shown participation and leadership in extracurricular activities.

Each candidate is nominated by at least three students and selection is made by a committee of the Hleodor Society composed of a first-year student, a second-year student, a final-year student, at least one member of the executive of the Hleodor Society, the Registrar, and a member

of Faculty. Nominations must be forwarded to the Registrar not later than February 15.

Established 1953, in memory of Mrs. M. M. MacOdrum, by the Hleodor Society of Carleton University.

Jean Feltrin Memorial Scholarship (Hleodor Society)

Value $100. Awarded annually, if merited, to a woman student proceeding to the final year of the honours course at Carleton, or entering graduate work here following graduation in the bachelor's course.

Established 1961, by the Hleodor Society of Carleton University, in memory of Jean Feltrin, a special student of the University in 1954-55, who gallantly endeavoured to carry on studies while almost totally immobilized as a post-poliomyelitis patient.

C. V. Hotson Memorial Scholarship

Value $100. The C. V. Hotson Memorial Scholarship, awarded annually to an undergraduate student, who maintains high academic standing and is active in student affairs. Donated by Carleton Alumni and other friends in memory of Mr. Hotson, a 1956 Carleton Journalism graduate and former member of the Students' Council who returned to Carleton in 1953 to become Administrative Assistant to the President and Executive Secretary of the Alumni Association, positions he held until his death.

J. P. Bickell Foundation Scholarships

The Trustees of the J. P. Bickell Foundation have established in the Department of Geology, Faculty of Arts and Science, scholarships for students entering the Geological profession, of a possible value of $1,200 each. The Scholarships may be awarded on entrance into the Honours Geological sequence at the First, Second or Third year levels at Carleton University. The scholarships are payable over two or three years depending on the entrance level.

Application must be made to the Chairman of the Department of Geology by May 15. In order to be eligible, the applicant must undertake to register in the Honours Geology sequence with a minor in Biology, Chemistry, Mathematics, or Physics; or a combined Honours sequence of Geology and one of the above-mentioned subjects.

Full particulars and application forms may be obtained from the Registrar of the University.

Regent Vending Machines Ltd., Scholarships

Two scholarships of value $100 each. One scholarship is awarded annually to an outstanding student in Engineering proceeding from the first to the second year in the Engineering curriculum; and the second scholarship to such a student proceeding from the second to the third

year of that curriculum. Donor: Regent Vending Machines, Limited. Established 1954.

Ottawa Valley Aquarium Society Scholarship

Value $50. Awarded annually to an outstanding student proceeding from the Second to Third year of the major course in Biology at Carleton University.

Donor: Ottawa Valley Aquarium Society. Established 1960.

Riddell, Stead, Graham and Hutchison Award

This award is given to a student who is completing his pre-graduating year and is proceeding on to his graduating year. The form of the award is the payment of the student's tuition fees for his final undergraduate year at Carleton. The award will be made to the student whose personality, ability, academic record and other characteristics are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant. Applications should be submitted to the Chairman of the Committee on Commerce Studies before March 1.

Touche, Ross, Bailey and Smart Scholarship

This scholarship is in the amount of $250. It will be awarded to a student who is entering the final year of the degree course in Commerce, and who intends upon graduation to study for the qualification of Chartered Accountant. The award will be made to the student whose character, ability, academic records, and other qualities are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant. Applications should be submitted to the Chairman of the Commerce Studies before March 1.

Government of Ontario Scholarships

The Government of Ontario has, for the academic year 1962-63, greatly expanded its student-aid program by appropriating the sum of $1,200,000 to that end and by authorizing the use of a portion of that sum for the award of a number of Ontario Scholarships to students who show outstanding ability as evidenced by their results on the annual Grade XIII Departmental examinations.

Ontario Scholarships of the value of $400 may be awarded to applicants who obtain an average of not less than 80 per cent on eight papers of the Grade XIII Departmental examinations (including both papers in English), all written in the year of application, and who enrol in an eligible institution in September, 1962. Scholarship announcement and application forms have been sent to the schools.

The Duchess of Connaught Scholarship

The yield from the endowment of this historic scholarship, amounting to approximately $350 annually, has been made available to Carleton University by the Laurentian Chapter, I.O.D.E. The scholarship is to be awarded to an able student entering Carleton University, and may be held until graduation, if merited; at which time a new award will be made.

Donor: Laurentian Chapter, I.O.D.E. Established at Carleton University, 1960.

Commonwealth Scholarships

Under a Plan drawn up at a conference held in Oxford in 1959, each participating country of the Commonwealth offers a number of scholarships to students of other Commonwealth countries. These scholarships are mainly for graduate study and are tenable in the country making the offer. Awards are normally for two years and cover travelling, tuition fees, other university fees, and a living allowance.

For details of the awards offered by the various countries consult the Registrar of Carleton University or write to The Canadian Universities Foundation, 77 Metcalfe Street, Ottawa. Persons doing so are advised to inquire not later than October 11 in 1962, if planning to apply for the year 1963-64.

Canadian Waterman Foundation Scholarships

Ten scholarships of $100, one in each of the ten Ontario universities, including Carleton University, will be presented to the student among those admitted to the university who ranked highest at the Ontario Grade 13 examinations in the year of the award according to the conditions of the Foundation Scholarship Committee.

On September 1 the University Registrar will be asked to declare to the Department of Education the name of the Ontario student ranking highest among those admitted to Carleton University. The Department in its turn will notify the Foundation so that cheques in favour of the winner may be sent to the school principal.

The Leonard Foundation Scholarships

The Leonard Foundation Scholarships are awarded each year to select students in Canadian universities and colleges, including Carleton University. Awards are based on certain areas of preference.

Applications must be submitted by March 1 on special forms which may be obtained in the Registrar's office.

II. POST-GRADUATE AWARDS TENABLE AT CARLETON UNIVERSITY:

GENERAL:

Carleton University offers annually a number of Fellowships of value $2000. For 1962-63 these comprise 14 Fellowships, a minimum of four to be in Arts, and a minimum of four in Science and Engineering together. The Fellowships carry with them limited teaching duties; they do not include remission of fees. Bursary and loan funds are also available for graduate students (see pp. 204 and 210).

Applications for the Fellowships must be received by March 1.

PUBLIC ADMINISTRATION:

The following awards are available for study in the academic year 1962-63:

1. For full-time study for the Master of Arts degree or the Diploma in Public Administration:
   (a) one scholarship of $1500;
   (b) two scholarships of $1000 each;
   (c) two scholarships of $750 each.
2. For part-time study toward the M.A. or Diploma in Public Administration — ten scholarships, each equivalent to the tuition fee for the current year.

Providing that there are fully qualified applicants presently employed in the Public Service of Canada, one or more of the scholarships for full-time study will be awarded to public servants. They could then apply to their departments for educational leave with partial pay.

Applications for awards for full-time study must be received by April 1, and for part-time study by May 1. Announcement of the awards will be made shortly thereafter. Application may also be made, up to August 31, for awards not granted or taken up in April or May. A full-time Fellow or Scholar may in addition apply, at any time, for a loan of up to $1,500 or for a bursary. The required forms for such loan or bursary may be obtained from the Student Personnel Office.

Reader's Digest Fellowships in Journalism

Two fellowships of $500 each are available to graduates in Arts who have good standing in other academic subjects and who have concentrated especially in English, History, Psychology and one or more of the social sciences. Experience in practical journalism in any medium should be reported and will be taken into account. All the material relevant to the application, including information on past experience in newspaper, magazine, radio, TV or other fields of journalism or writing, together with letters of reference from newspaper editors, must be in the hands of the Registrar, Carleton University, by July 15 of the year in which the fellowship is awarded.

Donor: Reader's Digest Association (Canada) Limited. Established 1961.

Students are invited to watch the University bulletin board for notices of scholarships, and to consult the Registrar who has a number of publications outlining fellowships and scholarships available for study in the various universities in Canada and abroad.

PRIZES

Clarkson, Gordon & Co. Prize

Value $100. Awarded annually to the student with the highest standing in the First year of the Commerce course. Donor: Clarkson, Gordon & Co. Established 1962.

B'nai B'rith Awards

Two of $50 each, awarded annually to students with superior academic records, progressing from one course-year to another in Carleton University. Donor: B'nai B'rith, Ottawa Lodge No. 885. Established 1947.

Faculty Club Prize

Value $25. Awarded by the Faculty Club of Carleton University to a student chosen by the President. Established 1946.

National Council of Jewish Women Award

Value $100. Awarded on the recommendation of the Department of History to the student achieving the best standing in Canadian History. Donor: National Council of Jewish Women, Ottawa Section. Established 1950.

Lilian I. Found Prize for Poetry

Value $25. Offered annually for the best lyric of fifty lines or less submitted by an undergraduate of Carleton University by March 15. Details may be obtained from the Registrar's office. Donor: Mrs. Lilian I. Found. Endowed 1950.

Chemical Institute of Canada Prize

Value $25. Awarded as a book prize to the best student proceeding to the final year of the course leading to the degree of Bachelor of Science with honours in Chemistry. Donor: The Chemical Institute of Canada. Established 1950.

Roderick C. McDonald Prize in Engineering

Value $250. Awarded annually to a graduating Engineering student. Donated by Mrs. Ishbel A. McDonald in memory of her husband, Roderick C. McDonald, who, before his death in 1961, was a member of the faculty of the School of Engineering. Established 1962.

Engineering Institute of Canada (Ottawa Branch) Prizes

For proficiency in engineering studies, a prize of $35 is awarded to a student completing second-year Engineering, and a book prize of the value of $15 is awarded to a student completing first-year Engineering. Donor: Ottawa Branch, Engineering Institute of Canada. Established 1947.

Engineering Institute of Canada Prize

Value $50. Offered annually to a deserving student in the final year of the Engineering course.

Donor: The Engineering Institute of Canada. Established 1961.

D. F. McKechnie Prize in Accounting

The yield of a $200 fund is used each year to purchase a book prize to be awarded, when merited, to a student in Commerce for proficiency in the study of accounting. Donor: D. F. McKechnie, C.P.A. Endowed 1951.

Society of Chemical Industry Award

A gold key with the crest of the Society of Chemical Industry in front and the name of the winner, course, year and university on back is granted to the student who has the highest standing in the final year of the honours course in Chemistry. Winner will also receive a year's subscription to the Journal, Chemistry and Industry. Donor: Canadian Section, Society of Chemical Industry. Established 1961.

Prize of the Seniorettes of the National Council of Jewish Women, Ottawa Section

Value $50. Awarded annually, if merited, on the recommendation of the Department of Psychology, to a Second year woman student majoring in Psychology, who is judged to be the most promising in this field. Donor: The Seniorettes of National Council of Jewish Women. Established 1956.

American Society for Metals Prize in Engineering

Value $25. Awarded annually to a student with high standing in the first year of the Engineering course. Donor: Ottawa Valley Chapter, American Society for Metals. Established 1951.

Henry Birks and Sons (Ontario) Ltd., Award

Value $25. Awarded annually to a Carleton University student with a superior academic record who has contributed substantially to extra-curricular activities. Donor: Henry Birks and Sons (Ontario) Ltd. Established 1951.

Wilgar Memorial Prize in English

The yield of a $200 fund is used each year for a book prize to be awarded to a Carleton University undergraduate who has shown excellence in essay-writing. Established 1951, in memory of the late W. P. Wilgar, Assistant Professor of English at Carleton University, 1948-50. Endowed 1952.

Henry Marshall Tory Award

Presented annually to an outstanding graduating student who has shown a high degree of academic application, has indicated an interest in the University by broad participation in extracurricular activities of a constructive nature, has indicated qualities of leadership, and has attended Carleton University for at least three winter sessions.

Each candidate is nominated by at least five members of the Students' Association and selection is made by a committee composed of the President of the University, the Registrar, a member of the Faculty Board, and three students chosen by the Students' Council.

The Winner's name is inscribed on the master trophy and he receives a miniature replica.

The award was established in 1950 by the Students' Council of Carleton University.

H. Carl Goldenberg Book Prize

Value $10. Awarded annually as a book prize for excellence in Journalism subjects taken in the Second year of the Bachelor of Journalism Course. Donor: H. Carl Goldenberg, O.B.E., Q.C., of Montreal. Established 1953.

Kenneth R. Wilson Memorial Award for Journalism Graduates

Value about $200. Offered annually to a student graduating in Journalism who, in the opinion of a board of selection, shows exceptional promise as a future reporter and interpreter of Canadian affairs. Endowed 1953, in memory of Kenneth R. Wilson, Ottawa Editor of The Financial Post, by a group of his personal friends.

Catherine Daumery Memorial Prize for Botanical Collection

Value $35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of mounted and identified flowering plants. Donor: Anonymous. Established 1953.

Elizabeth White Memorial Prize for Zoological Collection

Value $35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of insects or arachnids, properly preserved and identified. Donor: Anonymous. Established 1953.

The Ottawa South Branch (W.C.T.U.) Prize in Sociology

Value $50. To be awarded in 1962, if merited, to a student of Carleton University chosen by the Department of Sociology for excellence in the study of Sociology. Donor: The Ottawa South Branch of the Women's Christian Temperance Union.

Donald Lawrence Moulds Memorial Prize in English

Value $50. Awarded annually, if merited, on the recommendation of the Department of English Language and Literature, to an outstanding student proceeding beyond the First year of the pass or honours course in English. Established 1954 by Ernest Moulds, in memory of his son who was killed in action while serving as a Spitfire pilot in the R.C.A.F. overseas in World War II, 1942.

Alan Larocque Prize in Mathematics

Value $15. Awarded annually as a book prize to the highest ranking graduate in honours Mathematics. Donor: Alan Larocque, B.Sc., an honours graduate in Mathematics of Carleton University. Established 1956.

The Dr. M. Ralph Berke Prize in Chemistry

The yield of a $500 fund is awarded each year, if merited, on the recommendation of the Department of Chemistry for a prize to be awarded to an outstanding student majoring in Chemistry proceeding from the Second to the Third year of the degree course.

Donor: Dr. M. Ralph Berke. Established 1956.

American Society H.R.A.E. Prizes

Value $100, to be awarded in 1962-63 as follows: one first prize of $75 for the best Summer Essay; one second prize of $25 for the Summer Essay.

Donor: American Society of Heating, Refrigerating, and Air Conditioning Engineers, Ottawa Valley Chapter. Established 1958.

The Ann Smith Freedman Memorial Prize

Value $50. Awarded to the student in Psychology who has gained the highest standing in the experimental paper in Psychology 305 during the academic year. Donor: Mr. and Mrs. Jarvis Freedman. Established 1958.

Prize of the Canadian Institute of Mining and Metallurgy (Ottawa Branch)

Value $25. To be awarded to a worthy student completing his second year at Carleton University and registered in one of the branches of the mineral industry; the student to have attained at least high second class honours; the selection to be made by the Director of the School of Engineering and the Chairman of the Department of Geology, jointly. Established 1956.

International Nickel Co. of Canada Ltd. Award in Journalism

For the year 1962-63, for the graduating student in Journalism with the best record in the Journalism subjects, a plaque and the prize of a portable typewriter is provided by the International Nickel Company of Canada, Limited. Established 1960.

Wild of Canada Ltd., Prize in Engineering

A prize of a set of stainless steel drawing instruments is awarded annually to a student in first year Engineering at Carleton University judged most worthy of the award by the School of Engineering.

Donor: Wild of Canada Limited.   Established 1960.

De Waan Foundation Prize on Arab Problems

Each year for a period of five years from the first year of award, the De Waan Foundation offers a prize for work of appropriate scholarly level by an upper class student on the problems of Arab countries. Annual value, $100.   Students wishing to prepare for this award should first consult the Director of the School of Public Administration.

Donor: De Waan Foundation, 1960.

Encyclopaedia Britannica of Canada Ltd. Prizes

A set of the Great Books of the Western World has been made available annually for a graduating student in science, and also a graduating student in engineering, with the best record of scholastic achievement in the other areas which are generally recognized as comprising a liberal education.

Donor: Encyclopaedia Britannica of Canada Limited. Established 1961.

Frances Oakes Baldwin Prize in Journalism

Value $150.   Awarded to the undergraduate with the best record in the Second year Journalism degree program during the academic term 1962-63.

Donor: Mrs. Frances Oakes Baldwin.   In memory of the pioneers of the Kincaid district, Saskatchewan.   First awarded, 1959.

Prize of the Ambassador of Switzerland to Canada

For excellence in the study of French, a book prize is offered annually by the Ambassador of Switzerland to Canada. Established 1953.

French Embassy Awards

French Embassy Book Prize, for excellence in the study of French, a book prize is presented by the French Embassy in Canada. Established 1953.

French Embassy Medal, awarded, if merited, to a graduating student for excellence in French. Established 1955.

Prize of the Embassy of the Federal Republic of Germany

For excellence in the study of German, a book prize is offered annually by the Embassy of the Federal Republic of Germany in Canada. Established 1955.

Prize of the Embassy of Austria

For excellence in the study of German, a book prize is offered annually by the Austrian Embassy in Canada. Established 1960.

Spanish Embassy Prize

For excellence in the study of Spanish, a book prize is offered annually by the Spanish Embassy in Canada. Established 1960.

MEDALS

The Governor-General's Medal

Awarded annually, provided first class standing is obtained, to the student standing at the head of the graduating class. Donor: His Excellency the Governor-General of Canada. Established 1952.

University Medals

Awarded annually, when merited, to the graduating students standing highest in Arts, Science, Commerce, Journalism, and Engineering. Established 1949.

Senate Medals

Awarded, when merited, to graduating students of outstanding academic achievement. Established 1952.

Medal in Engineering (Ontario Association of Professional Engineers)

Awarded annually, when merited, to the graduating student standing highest in Engineering. Established 1961.

BURSARIES

Applications for Dominion-Provincial Student-Aid Bursaries, Type A, for Atkinson Charitable Foundation Entrance Bursaries, and for Rotary Club and Lions Club Awards (for students entering university from secondary school) should be made through secondary school principals. Applications for Dominion-Provincial Student-Aid Bursaries, Type B (for students progressing from one year to another in university) should be made through the Student Personnel Officer of Carleton University after the commencement of fall classes.

Bursaries are awarded to students who have maintained sound standing and who show evidence of genuine financial need. Bursary holders are expected to maintain their level of scholarship.

Applications for all other bursaries listed below should be made through the Student Personnel Office not later than August 31.

University General Bursary Fund

A sum of $6800 is available in 1962-63 to provide bursaries in aid of students with satisfactory academic standing who, in the first or subsequent course-years, are in need of financial assistance. Established by the University in 1954.

Graduate Bursary Fund

The sum of $2,000 is available in 1962-63 to provide bursaries for graduate students with appropriate academic standing who are in need of financial assistance. Established by the University, 1958.

Provincial and Dominion-Provincial Student-Aid Bursaries

Value up to $500 each and tenable at the various colleges and universities of Canada, including Carleton University. They are awarded to "students of good character, whose health and physical fitness are satisfactory, who meet the required academic standing, and who, without financial assistance, could not continue their formal education."

Candidates must be residents of Ontario and have obtained at least second-class standing in the examinations of the year prior to that for which the bursary would be used.

Charles Ogilvy Ltd., Bursary Fund

Value $1000. To provide bursaries for students with good academic standing and who are in need of financial assistance.

Donor: Charles Ogilvy Limited. Established 1960.

ATA Trucking Industry Educational Foundation, Bursary Fund

Value $1,200. To provide bursaries for First or Second year students who, due to extenuating circumstances, are deserving of financial assistance, and without such assistance would be unable to continue their studies.

Donor: Automotive Transport Association of Ontario (Inc.) Established 1959.

Altrusa Club of Ottawa Bursary

Value $100. Awarded to a deserving woman student proceeding into the third or graduating year at Carleton University. Preference to be given to a student enrolled in Science or Journalism where other qualifications are equal.

Donor: The Altrusa Club of Ottawa. Established 1962.

Rotary Club of Ottawa Awards

Entrance Awards

Value up to $400 each, awarded annually, on the basis of scholarship and financial need, to students from Ottawa schools entering a

college or university. One or more of these may be held at Carleton University.

Continuation Awards

Available to students who are residents of Ottawa, have completed successfully at least one year at the University, and have been nominated by the University authorities on the basis of ability and need.

Lions Club of Ottawa Awards

Value up to $400 each. Awarded annually to Ottawa students who, without financial assistance, could not continue their formal education. These may be held at Carleton University.

Kinsmen Club of Ottawa Awards

Value up to $500 each. Awarded annually to Ottawa senior high school boys who, without financial assistance, could not continue their formal education. Certain of these may be held at Carleton University.

Ottawa Superfluity Shop Bursaries

An annual sum of approximately $180 is available to provide bursaries for veterans of World War I or World War II, or for the descendants of such veterans, who are students in good standing at Carleton University and in need of financial assistance. Endowed 1947.

Ottawa Citizens' War Services Committee Bursary

An annual sum of approximately $60 is available to assist veterans, their dependents or descendants, who are students in good standing at Carleton University and are in need of financial assistance. Endowed 1948.

Gyro Club Bursaries

Two bursaries of $250 each. Awarded annually to male students of promise who have completed at least one academic year at Carleton University, who have specific professional or vocational goals, and who, without financial assistance, could not continue their formal education. Donor: Gyro Club of Ottawa. Established 1949.

Wild of Canada Ltd. Bursary

Value $250. Awarded annually to a student majoring in Biology, with good academic standing and who is in need of financial assistance. Donor: Wild of Canada Limited. Established 1961.

Quota Club Bursary Fund

The sum of $200 is available for the year 1962-63 to aid women students in good standing who are in need of financial assistance. Donor· Quota Club of Ottawa. Established 1950.

The Mary C. Grant Bursary (Laurentian Chapter, I.O.D.E.)

Value $450. Awarded annually to a particularly able student enter-
ing Carleton University or proceeding from one year of course to
another, and requiring financial assistance to complete his or her studies.

The bursary has been established in honour of Mary C. Grant.

Donor: The Laurentian Chapter, I.O.D.E. Established 1962.

J. P. Bickell Foundation Bursary Fund

Value to be announced. The Trustees of the J. P. Bickell Founda-
tion have established bursaries in the Faculty of Arts and Sciences. An
applicant must be taking a normal sequence of courses leading to a
degree in Geology and must have competent academic standing. Carleton
students may obtain full details of the Bursary from the Student Person-
nel Officer. Donor: J. P. Bickell Foundation, Toronto. Established
1956.

Loyal Order of Moose Bursary

Value $200. To be awarded to an entering student of good academic
standing and in need of financial assistance. Donor: Ottawa Lodge No.
1765, Loyal Order of Moose. Established 1958.

Carleton University Faculty Bursary Fund

Provided annually by the Faculty to assist students of good academic
standing who have completed one academic year in the University and
who are in need of financial assistance. Established 1958.

Ottawa Business and Professional Women's Club Continuing Bursary

Value $200. Awarded to a girl with competent standing in the
Senior Matriculation examination, graduating from a collegiate institute
or high school in Carleton County.

The bursary may be held until graduation, renewable annually,
provided the student maintains satisfactory standing in her studies at
Carleton.

Donor: Ottawa Business and Professional Women's Club. Establish-
ed 1959.

Falkland Chapter (I.O.D.E.) Bursary

Value $100. Awarded to a deserving student progressing from one
year of course to another in Carleton University. Donor: Falkland
Chapter, I.O.D.E. Established 1950.

Knights of Pythias, Aurora Lodge No. 53 Bursary

Value $100. Awarded 1962-63 to a good student, progressing from one year of course to another, who needs financial assistance to continue his or her studies.

Donor: Knights of Pythias, Aurora Lodge No. 53. Established 1960.

Atkinson Charitable Foundation Bursary Fund

The sum of $2,000 is available to assist students of Carleton University in the academic year 1962-63. Terms of award are as follows:

1. In addition to scholastic merit and financial need, goal and promise will be considered in selecting recipients.
2. Candidates must be residents of Ontario.
3. Applications may be for sums up to $500.
4. An applicant must have completed at least one academic year and be enrolled as a full-time undergraduate in any course at Carleton University.
5. For one of the awards, preference will be given to candidates intending later to pursue studies in Theology.
6. Applications should be made on forms available from the Student Personnel Office, not later than August 31, 1962.

Donor: The Atkinson Charitable Foundation. Offered for the first time in 1951, as an experiment in the provision of financial aid to students.

Atkinson Charitable Foundation Entrance Bursaries

Value: $400 for students living away from home, $200 for students residing within commuting distance of the university. Candidates must be residents of Ontario and in need of financial assistance. They must obtain an average of at least 66% on eight Ontario Grade XIII examination papers, be qualified for entry to the degree course of their choice, and be sponsored by their high school principals. Application should be made through the high school principal before May 1. Carleton University is one of the Ontario universities at which these bursaries may be held. Donor: The Atkinson Charitable Foundation, Toronto. Established 1953.

The Maurice Frederick Carty Bursary

Value $300. To be awarded annually to a student in course who would not otherwise be able to proceed without delay to a higher year within the University. Donor: Mrs. E. G. Carty, in memory of her son, Maurice Frederick Carty. Established 1957.

Countess of Ashburnham Chapter (I.O.D.E.) Bursary

Value $300. To be awarded annually to a student entering Carleton University, or already in course, who is in need of financial assistance to carry on full-time studies. Donor: The Countess of Ashburnham Chapter I.O.D.E. Established 1959.

Protestant Girls' Club of Canada Bursary

Value $100. To be awarded annually to a Protestant girl or girls proceeding into the graduating year at Carleton University. Donor: The Protestant Girls' Club of Canada. Established 1955.

Arnhem Chapter (I.O.D.E.) Bursary

Value $100. to be awarded in the academic year 1962-63 to a student with satisfactory academic standing who in the judgment of the President of Carleton University is in need and deserving of financial assistance. Donor: Arnhem Chapter I.O.D.E. Established 1955.

R. A. Beamish Bursary

Value: approximately $250. Awarded annually to a student entering or progressing from one academic year to another who, without financial assistance, could not continue his or her formal education. To be eligible, an applicant must be a resident of one of the eleven eastern counties of Ontario (Renfrew, Frontenac, Lanark, Leeds, Carleton, Grenville, Russell, Dundas, Prescott, Glengarry, Stormont). Donor: The R. A. Beamish Foundation. Endowed 1951.

South Ottawa Kiwanis Club Bursaries

(1)   Value $250. Awarded annually to a student who has completed successfully at least one academic year in Carleton University and who, without financial assistance, could not continue college studies. Donor: Kiwanis Club of South Ottawa. Established 1951.

(2)   Value $250. Awarded annually to a student who has completed successfully at least one academic year in Carleton University and who, without financial assistance, could not continue college studies. Restricted to students from Ottawa and from areas outside the capital in Carleton and Russell Counties.

Donor: Kiwanis Club of South Ottawa. Established 1958.

South Ottawa Kiwanis Club (*Ladies Auxiliary*) Bursary

Value $50. To be awarded in the academic year 1962-63 to a woman student who has completed one academic year at Carleton University, and who is in need of, and deserving of, assistance to continue studies as a full-time student. Donor: Kiwanis Club of South Ottawa (Ladies Auxiliary). Established 1956.

Lions Club of Ottawa (South) Inc.

Two bursaries of value $100 each, to be awarded annually to a student of good character, who exhibits proficiency and promise, and who has completed one academic year at the University, and who, without the benefit of financial assistance, would be unable to continue his or her chosen studies. Donor: Lions Club of Ottawa (South) Inc. Established 1957.

James H. Rattray Memorial Bursaries

Value $200 each. Three bursaries for students in Science and Engineering, with certain areas of preference. (Candidates are invited to inquire about these from the Student Personnel Office).

Donor: The late James H. Rattray, M.C. Established 1961.

Engineers' Wives Association Bursary

Value $200. To be awarded annually to a deserving student enrolled in the First year of Engineering.

Donor: Engineers' Wives Association of Ottawa. Established 1959.

Earnscliffe Chapter (I.O.D.E.) Bursary

Value $250. Awarded annually to students entering or progressing from one year of course to another in Carleton University, who have sound academic standing and are in need of financial assistance.

Donor: Earnscliffe Chapter I.O.D.E. Established 1962 in honour of Mrs. G. Scott Murray.

Ottawa Poppy Welfare Fund University Award

The Ottawa Poppy Welfare Committee offers for 1962 an amount of Fifteen Hundred Dollars ($1,500.00) to be used as awards to university entrance or to assist good students who are short of funds to continue in university. The amount of an award is Three Hundred Dollars ($300.00) to any one student but this amount may be modified depending on financial circumstances.

Application forms are available at Poppy Fund Headquarters, Trafalgar House, or the Student Personnel Office, Carleton University. Donor: The Ottawa Welfare Poppy Fund Committee. Established 1956.

National Memorial Chapter (I.O.D.E.) Entrance Bursary

Value $100. To be awarded to a student entering Carleton University in 1962 who requires financial aid to begin the University course. Donor: National Memorial Chapter I.O.D.E.

Philemon Wright Chapter (I.O.D.E.) Bursary

Value $75. Awarded annually to a student with satisfactory academic standing who is in need of financial assistance. Open only to residents of the Province of Quebec, with preference to those resident in the County of Hull and adjoining counties. Donor: Philemon Wright Chapter, I.O.D.E. Established 1952.

C. A. Fitzsimmons and Company Ltd. Bursary

Value $150. Awarded annually to a competent student entering Carleton University who, without financial assistance, could not continue his or her formal education. Donor: C. A. Fitzsimmons and Company Limited, Ottawa. Established 1960.

Harry Wood and Company Bursary

Value $150.   Awarded annually to a deserving student in Commerce in need of financial assistance.

Donor: Harry Wood and Company.   Established 1960.

The Phillips Bursary

Value — approximately $200, the annual yield of a fund of $5,000 made available to Carleton University by Miss L. A. Phillips.   The bursary is to be awarded each year to a student with good academic standing who is in need of financial assistance.   Endowed, 1962.

Children of War Dead (*Education Assistance*) Act

This act provides fees and monthly allowances for children of veterans whose deaths were attributable to military service.   Enquiries should be directed to the nearest District Office of the Department of Veterans Affairs.

LOAN FUNDS

The university administers several loan funds which are available for short and long term loans to students in need of financial aid.

Loans made from funds held in trust by the University are repayable after termination of undergraduate studies, and bear interest at the rate of 4% per annum beginning January 1 following the termination of studies. To be eligible for a loan from one of these funds, a student must have a satisfactory academic record and be able to show that he could not continue his studies without financial assistance.

General Loan Fund. Unrestricted. In addition to loans made on the general basis outlined above, one-month loans of up to $25 may be made from this fund. Applications will be received by the Student Personnel Officer. Founded by Kenneth Brewster. Other donors: Women of Rotary, Office Staff of Carleton University, F. J. G. Cunningham, Katherine J. Milliken, Mrs. J. S. MacLean, the late Mrs. Lila Wilson, and several anonymous donors.   Established 1948.

John W. Parker Loan Fund. To assist students in need of, and deserving of, financial assistance, who appear willing and able to repay their loans. Undergraduates will normally be expected to have completed at least one year at Carleton University. Applicants must present a passing grade and show evidence in their academic record of likelihood of graduation. Under normal circumstances, the maximum loan to a student shall be $500 a year, but loans up to $1,500 a year to students with dependents may be made, if merited. Donor: The late Mrs. John W. Parker. Established 1955.

Provincial Student-Aid Loans

Value up to $500 each and tenable at the various colleges and universities of Ontario, including Carleton University. They are awarded to students of good character, whose health is satisfactory, who meet the required academic standing, and who, without financial assistance, could not continue their formal education.

Candidates must be residents of Ontario and have obtained at least third-class standing in the examinations of the year prior to that for which the loan would be used.

Applications are available in the Student Personnel Office.

Journalism Loan Fund. Reserved for students in the course leading to the degree of Bachelor of Journalism. Founded by The Canadian Women's Press Club, Ottawa Branch. Other donors: Rielle Thomson, Kenneth Wilson, Blair Fraser, Canadian Pulp and Paper Association, Bruce Hutchison, F. P. Galbraith, Serrell Hillman, T. W. L. MacDermot. Established 1948.

Commerce Loan Fund. Preference is given to students in the course leading to the degree of Bachelor of Commerce. Founded in 1949 by the class of Commerce '49. Other donors: Class of Commerce '50.

Laurentian Chapter (I.O.D.E.) Small Loan Fund

The sum of $200 has been made available to assist in providing small emergency short-term loans to students in need. Donor: Laurentian Chapter I.O.D.E. Established 1950; revised 1959.

Arrangements may be made, on occasion, for assistance from funds administered by other organizations, among which are:

Veterans' University Loan Fund. Administered for the Department of Veterans Affairs to aid student veterans who are in receipt of allowances but need assistance to meet emergency expenses.

Royal Canadian Naval Benevolent Fund. The purpose of the Fund is to relieve distress and promote the well-being of naval personnel and their dependents both while serving and after discharge, except:

(a) Former permanent force personnel with less than one year's service unless they had service during World War II.

(b) Members of the Royal Canadian Navy (Reserve) with less than three year's service unless they had service during World War II.

Army Benevolent Fund. This fund exists to provide financial assistance to Army veterans in need. A student veteran may be considered for such assistance, however, only when he has received the maximum assistance for which he is eligible from the Veterans' University Loan Fund or when the Army Benevolent Fund Committee agrees that it would not be in the best interests of the veteran's welfare to request him to undertake the responsibility of the repayment of a loan.

R.C.A.F. Benevolent Fund (*University Loan Fund*). This fund was planned to assist in the education of discharged members of the R.C.A.F., their children and children of deceased personnel. Sums up to a normal maximum of $300 may be borrowed and are repayable out of the following summer's earnings or after graduation, as preferred.

Harry F. Bennett Educational Fund. Administered by the Engineering Institute of Canada, this fund is available to provide financial assistance to deserving students who have successfully completed their first year in engineering.

P.E.O. Sisterhood Educational Fund. On recommendation by a local chapter of P.E.O., loans may be made for educational purposes to women students who have completed successfully at least one academic year of university studies. Loans shall not exceed $500 for one year of study or $1,000 for two or more years. In the case of loans for graduate students or seniors completing a four-year course, the maximum amount may be available for one year of study.

Further information regarding existing sources of scholarships and prizes may be had from the Registrar, and regarding bursaries and loans from the Student Personnel Officer.

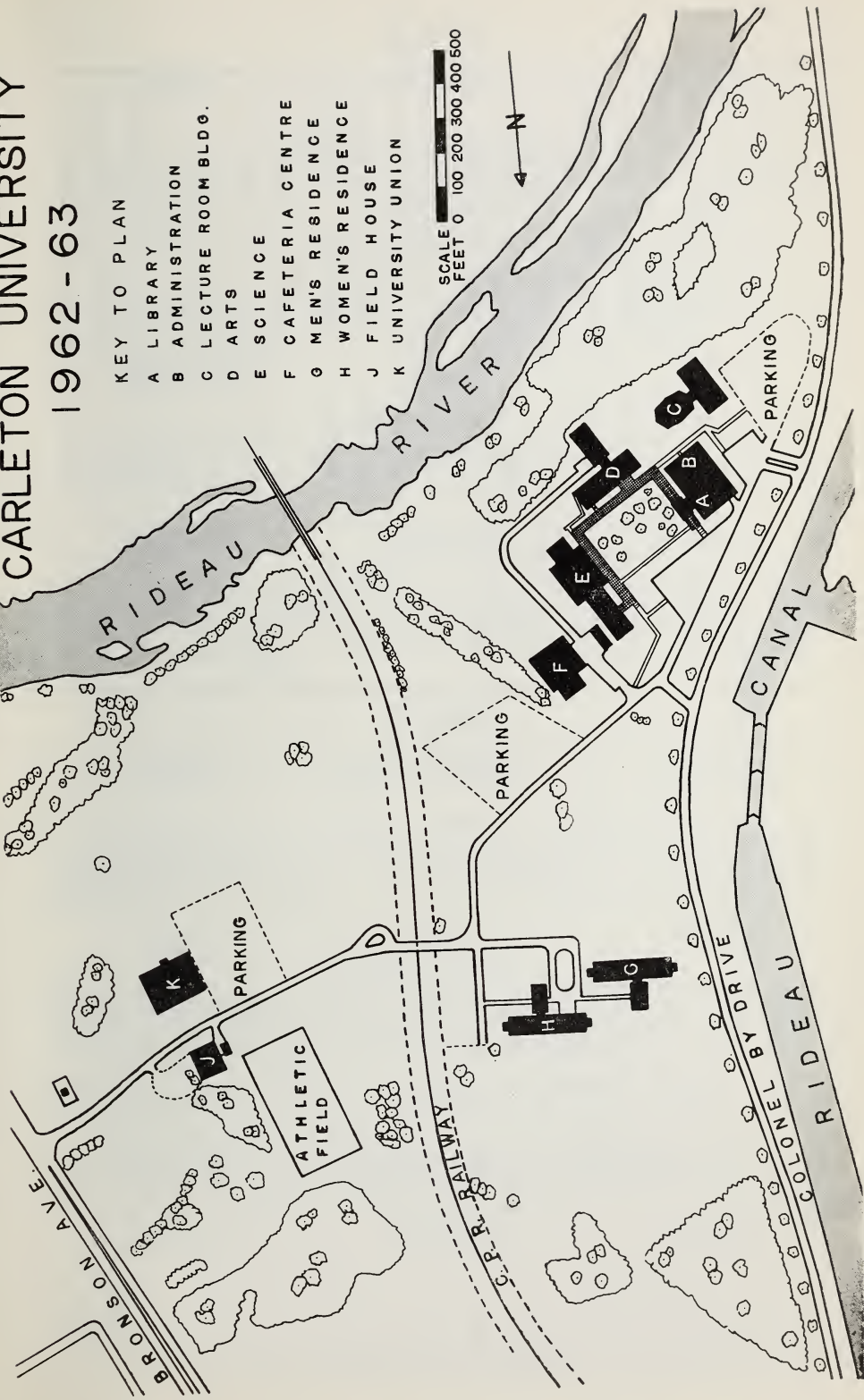# CARLETON UNIVERSITY
1962-63

KEY TO PLAN

A LIBRARY
B ADMINISTRATION
C LECTURE ROOM BLDG.
D ARTS
E SCIENCE
F CAFETERIA CENTRE
G MEN'S RESIDENCE
H WOMEN'S RESIDENCE
J FIELD HOUSE
K UNIVERSITY UNION

SCALE
FEET 0 100 200 300 400 500

N

RIDEAU RIVER

RIDEAU

CANAL

RIDEAU CANAL

COLONEL BY DRIVE

C.P.R. RAILWAY

BRONSON AVE.

ATHLETIC FIELD

PARKING

PARKING

PARKING

1962

	JANUARY							FEBRUARY							MARCH					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3					1	2	3
7	8	9	10	11	12	13	4	5	6	7	8	9	10	4	5	6	7	8	9	10
14	15	16	17	18	19	20	11	12	13	14	15	16	17	11	12	13	14	15	16	17
21	22	23	24	25	26	27	18	19	20	21	22	23	24	18	19	20	21	22	23	24
28	29	30	31				25	26	27	28				25	26	27	28	29	30	31

	APRIL							MAY							JUNE					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7			1	2	3	4	5						1	2
8	9	10	11	12	13	14	6	7	8	9	10	11	12	3	4	5	6	7	8	9
15	16	17	18	19	20	21	13	14	15	16	17	18	19	10	11	12	13	14	15	16
22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23
29	30						27	28	29	30	31			24	25	26	27	28	29	30

	JULY							AUGUST							SEPTEMBER					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7				1	2	3	4							1
8	9	10	11	12	13	14	5	6	7	8	9	10	11	2	3	4	5	6	7	8
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22	23	24	25	26	27	28	19	20	21	22	23	24	25	16	17	18	19	20	21	22
29	30	31					26	27	28	29	30	31		23	24	25	26	27	28	29
														30						

	OCTOBER							NOVEMBER							DECEMBER					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3							1
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8
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28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29
														30	31					

1963

	JANUARY							FEBRUARY							MARCH					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
		1	2	3	4	5						1	2						1	2
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20	21	22	23	24	25	26	17	18	19	20	21	22	23	17	18	19	20	21	22	23
27	28	29	30	31			24	25	26	27	28			24	25	26	27	28	29	30
														31						

	APRIL							MAY							JUNE					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8
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21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22
28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29
														30						

	JULY							AUGUST							SEPTEMBER					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
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21	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28
28	29	30	31				25	26	27	28	29	30	31	29	30					

	OCTOBER							NOVEMBER							DECEMBER					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
		1	2	3	4	5						1	2	1	2	3	4	5	6	7
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				

UNIVERSITY OFFICE HOURS

WINTER SESSION
September 4 to May 14

Monday to Friday
{ 8.30 a.m. to 12.30 p.m.
{ 1.00 p.m. to 9.00 p.m.

Saturday
9.00 a.m. to 12.30 p.m.

SUMMER SESSION
May 15 to September 3

Monday and Tuesday
{ 8.30 a.m. to 12 noon
{ 1.00 p.m. to 4.00 p.m.
{ 6.30 p.m. to 8.30 p.m.

Wednesday, Thursday, and Friday
{ 8.30 a.m. to 12 noon
{ 1.00 p.m. to 4.00 p.m.

Saturday
Closed all day.

LIBRARY HOURS

WINTER SESSION

Monday to Friday _____8.30 a.m. to 10.15 p.m.

Saturday _____9.45 a.m. to 4.45 p.m.

SUMMER SESSION

Monday to Friday _____8.30 a.m. to 4.00 p.m.

Monday to Thursday _____6.30 p.m. to 10.00 p.m.

Saturday _____Closed all day

When classes are not in session, hours vary and are posted at the entrance.